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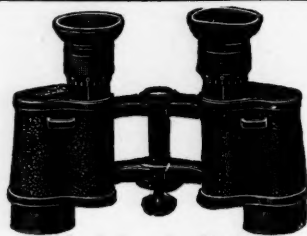
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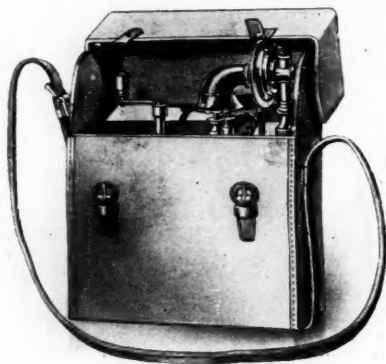


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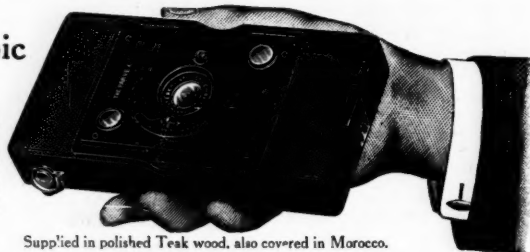
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120 yards at 10,000 yards.

BARR AND STROUD,
ANNIESLAND,
GLASGOW.



Telegraph and look-out station buried in snow at Minnimergh on the road to Gilgit.



The Approach to the Roof of the World.
Lieut. Etherton and his men passing through the stupendous Canyons of the Hunza Valley, on the way to the Roof of the World. The precipices rise on either side to a height of several thousand feet.



The Hunza Valley. The mountains in the background rise to a height of over 20,000 feet.



The Glacier below the Mintaka Pass. The latter Pass leads from the Hunza Valley on to the Pamirs.



Nomad Kirghiz with their Yaks on the Roof of the World.



The market place in Kashgar, Chinese Turkistan, showing curious veiled headdress of native women. Also buying and selling in the bazaar, and an ancient mosque, or Mohamedan place of worship, in the background.



Over the Desert Plains of Chinese Turkistan.



The Expedition crossing the Tekkas Valley in the Thian Shan Mts. Showing the strange nomad races met by the explorer. Also trophies of the rare Asiatic Wapiti.



Lieut. Etherton's Ibex camp near the Kok Terek Pass, in the Thian Shan Mts.



Three hundred Lamas who met the Expedition at Wong, in Mongolia, mainly to prevent photos of the interior of the Holy of Holies in centre being taken.



Through the Siberian Forests.



Garhwali orderly who accompanied Lieut. Etherton throughout the whole of his trans-Asiatic journey. He is seen standing by the side of a Siberian soldier.

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THE JOURNAL
OF THE
ROYAL UNITED SERVICE INSTITUTION.

VOL. LIV.

DECEMBER, 1910. No. 894.

[Authors alone are responsible for the contents of their respective Papers.]

SECRETARY'S NOTES.

I. NEW MEMBERS.

The following Officers joined the Institution during the month of November:—

- Captain E. F. W. Lees, Royal Engineers.
- Second-Lieutenant R. G. Welby, Grenadier Guards.
- Captain W. J. J. S. Haskett-Smith, Royal Irish Rifles.
- Captain W. Kemp Thomas, R.N.
- Captain F. E. Koebel, 51st Sikhs, I.A.
- Captain G. P. Paige, 4th Duke of Cornwall's Light Infantry.
- Captain H. K. Sadler, R.F.A.
- Lieutenant C. F. K. Carfrae, Oxfordshire Light Infantry.
- Second-Lieutenant P. G. Chevenix-Trench, K.R.R.C.
- Captain J. McM. Milling, Bedfordshire Regiment.
- Second-Lieutenant A. Blair, 25th Bn. London Regiment.
- Captain E. A. Bradford, K.R.R.C.
- Lieutenant B. R. Brooke, R.N.
- Captain J. M. Salmond, K.O. Royal Lancaster Regiment.
- Captain Cuthbert G. Chapman, M.V.O., R.N.
- Lieutenant J. A. Gregory, R.N.
- Captain J. Booth-Clarkson, late 3rd Royal Fusiliers.
- Captain A. White, 4th Bn. East Surrey Regiment.
- Lieut.-Colonel P. R. S. Lang, V.D., R.G.A. (T.F.).
- Lieutenant G. L. Coleridge, R.N.
- Captain S. Low, 16th Bn. London Regiment.
- Lieutenant P. C. M. Ash, 3rd Bn. London Regiment.

VOL. LIV.

II. GOLD MEDAL ESSAY (NAVAL), 1910.

The following Essays have been received :—

- "Res non verba."
- "Nunquam Dormio."
- "Si vis pacem para bellum" (i.).
- "One and all."
- "Si vis pacem para bellum" (ii.).
- "Einigkeit macht stark."
- "Divide et Impera."
- "Bis dat, qui cito dat."
- "The Trident of Neptune is the Sceptre of the World."
- "Jam galeam Pallas et aegida currusque et rabiem parat."
- "Mihi cura futuri."
- "United we stand, divided we fall."
- "A little fire is quickly trodden out, which, being suffered, rivers cannot quench."
- "Organise everything."
- "Festina lente."
- "What's true is now new, what's new is not true."
- "In sanguine vita."
- "Love one another; preserve your victuals; keep good company."
- "Consilio et prudentia."

III. GOLD MEDAL ESSAY (MILITARY) 1911.

The subject for the Military Gold Medal Essay for 1911 is as follows :—

- "The best National System for providing the necessary Military Force: (i.) to secure the safety of the United Kingdom on land; (ii.) to support the defence of the Empire; (iii.) to assist in maintaining the balance of power in Europe."

IV. THE EDITORSHIP.

The Council have appointed Captain H. A. L. H. Wade, R.A., *p.s.c.*, General Staff Officer at the War Office, to the post of Editor of the INSTITUTION JOURNAL. This officer will shortly retire from the Army, and take up his duties in March.

V. CRYPT.

The Crypt under the Banqueting Hall has now been reopened and the Exhibits rearranged, the whole of the interior having been repainted with white Ripolin paint, which has the effect of giving a very considerable increase in the lighting of the building.

VI. REGIMENTAL COLOURS.

The Secretary is prepared to arrange for the repairs to Regimental Colours and Cavalry Standards, in service or otherwise, at the Institution. A very large number have been received during the past seven years.

VII. LETTERS.

Officers are reminded that the Council can accept no responsibility in the matter of letters and telegrams addressed to them at the Institution, there being no arrangements for the reception and forwarding of members' letters, &c.

VIII. ADDITIONS TO THE MUSEUM.

(6258) The Order of the Dooranee Empire (3rd Class), awarded by Shah Shoojah in Cabul, 10th November, 1840, to James Atkinson, Esqre., Superintending Surgeon Bengal Establishment, as a mark of approbation of his services in Afghanistan. Letter from Sir William Macnaughton, Envoy and Minister, conferring the Order, and the Royal License signed by Queen Victoria on the 4th December, 1841, to accept and wear the insignia.—*Given by the Rev. Canon J. A. Atkinson.*

(6259) An Aquatint Engraving, published by E. Orme, 1805, of Constantinople (North View) with H.B.M.'s ships *Le Tigre* and *La Bonne Citoyenne*, under the command of Commodore Sir Sidney Smith, 1799.—*Given by Lieut.-Colonel H. S. Walker.*

(6260) Full-length Portrait of Sir Sidney Smith, engraved in stipple by Cardon after Eckstein (early state unfinished proof) depicting an incident in the defence of Acre.—*Given by Lieut.-Colonel H. S. Walker.*

(6261) Grenadier's Cap of the 67th Regiment with *queue* attached, and horsehair plume. Its date is about 1720.

(6262) Cap Badge of the 37th Regiment, worn by Lieutenant W. Johnson, who served in the regiment from 1813 to 1830.—*Given by Miss Parker.*

(6263) Figure Head of H.M.S. *Condor*. The *Condor* was a small gun vessel of 780 tons displacement, which in 1882, commanded by Commander Lord Charles Beresford, formed one of the fleet in the Mediterranean under the flag of Sir Beauchamp Seymour. At the bombardment of Alexandria, on the 11th July of that year, the *Condor* greatly distinguished herself, as she for some time engaged single-handed the powerful Marabout Fort, the fire from which, owing to the flanking position it occupied, was causing considerable annoyance to the ships engaged in attacking the Mex Forts. So skilfully handled was she by Lord Charles, and so accurate was her fire, that the Admiral made the signal before all the fleet, "Well done, *Condor*." On the town being occupied after the bombardment, Lord Charles was appointed Town Commandant, and so speedily did he organise an efficient police force, and so excellent were the arrangements he made, that in a very short time law and order was completely re-established. Armament of *Condor*.—One $4\frac{1}{2}$ ton 7-inch gun (112-pounder); two 64-pounders. Armament of Fort Marabout.—Two 18-ton guns, two 12-ton guns, two 10-inch guns, two 9-inch guns, twenty 32-pounders, and five mortars.—*Given by Admiral the Right Honble. Lord Charles Beresford, G.C.V.O., K.C.B., M.P., LL.D.*

- (6264) The Railway Station Board from Tel-el-Kebir, which was in position during that battle, fought on 13th September, 1882, when the British, 17,000 strong, attacked and stormed Arabi's entrenchments defended by 22,000 Egyptians.—*Given by Admiral the Right Honble. Lord Charles Beresford, G.C.V.O., K.C.B., M.P., LL.D.*
- (6265) Five Miniature Muskets and Stand, of about 1830, formerly the property of Field-Marshal H.R.H. the late Duke of Cambridge.—*Deposited by Naval Cadet H.R.H. the Prince of Wales.*
- (6266) Recruiting Poster for the Royal Navy, dated 2nd April, 1795.—*Given by Mr. William Porter.*
- (6267) A Line Engraving of "The Marquis of Wellington, K.B., at the Battle of Salamanca." Published by H. S. Minasi, 1812.—*Given by Miss Eleanor Lloyd.*
- (6268) A Water Colour Drawing of "The Blockhouse, Norman's Cross Barracks, 1809," where French prisoners of war were confined, executed by Captain George Lloyd, 2nd West York Militia in 1809.—*Given by Miss Eleanor Lloyd.*

NOTE.—In the Additions to the Museum, November JOURNAL, No. 6198 should read "General Craufurd"; Nos. 6247 and 6248, *Captain J. F. Leigh-Clare*, and not as therein described.

THROUGH THE HEART OF ASIA.

**Lieutenant P. T. ETHERTON, F.R.G.S., 1st Batt. 39th
Garhwal Rifles.**

On Wednesday, 2nd November, 1910.

Major-General Sir T. FRASER, K.C.B., C.M.G., in the Chair.

The Lecture was profusely illustrated with photographs taken by
Lieutenant Etherton, a few of which are reproduced.

NO part of the Asiatic Continent excites greater interest than the central portion of it, both from a political and sporting point of view.

I do not, however, propose to discuss the question from a political standpoint, but rather to give a brief account of a long trek across Asia from India to Siberia undertaken for purposes of sport and travel, a trek covering a distance of some 3,500 miles by a route to a large extent never previously traversed.

I had long contemplated undertaking such a journey, the primary object of which should be big game shooting and shikar generally.

The idea first took definite form in Chitral in 1906-7, where the 2nd Battalion of my regiment was then stationed. This lonely outpost lies beyond the north-west frontier, and it was whilst stationed there that I first conceived an ardent desire to penetrate beyond the mountains which hemmed us in. I wished to cross the mysterious Roof of the World, as the Pamirs have been fitly styled, to pass through the heart of Asia, to study the strange and interesting tribes there found, to enjoy to the full the incomparable shooting which awaits the shikari in the Thian Shan, and Great Altai Mountains. Thence I purposed trekking on through Mongolia and Siberia to the Trans-Siberian Railway.

The actual route traversed was from Lansdowne in Garhwal, via Rawal Pindi, and Murree, to Srinagar in Kashmir, and thence on through Gilgit, Hunza, across the Pamirs, continuing through Chinese Turkistan, Mongolia, and Siberia.

Great interest was taken in the expedition by my regiment, hopes being expressed that I might meet with a full success, and still further swell the splendid collection of trophies adorn-

ing the mess walls. At my own urgent request my commanding officer arranged that I should take a Garhwali orderly, a rifleman from my regiment, and when this became known amongst the men great keenness was displayed for the honour of selection. I decided to limit it to my own double company, from which there were 40 volunteers. The nature and extent of the journey were fully explained, and that the route would take us through wild and little-known parts of Asia, whilst the successful accomplishment of the undertaking was also pointed out as being by no means assured. Their ardour was not, however, in the least degree damped, the love of adventure and a journey into the unknown appealing strongly to them.

After careful examination a man was chosen to fill the coveted post. Rifleman Giyan Sing, the hero in question, followed my fortunes right through, being the only man to complete the entire journey with me from start to finish.

The Garhwalis, who are short in stature, but of sturdy build, are recruited from the mountain fastnesses of Garhwal, and with the military training, coupled with their own mountaineering and natural fighting qualities, form a fine combatant unit. Formerly a great many of them were enlisted in Gúrkha regiments and contributed a by no means insignificant share to the honours borne by some of the more famous of those units. It was not until 1887 that Lord Roberts, then commanding in India, conceived the happy idea of forming all the Garhwalis, then serving in Gúrkha regiments, into one battalion, and the experiment met with such success that a second battalion was raised in 1901. The Garhwali, though he in many respects resembles the Gúrkha in his qualities as a soldier, is of a distinct race and not to be tribally confounded with the latter.

Lansdowne, the starting point of the expedition, is situated amongst the foothills of the Himalayas in the British district of Garhwal, at an elevation of 6,000 feet. The nearest railway station is Kotdwara, about 130 miles north-west of Bareilly, and there is a cart road, 26 miles long, connecting it with Lansdowne, while the bridle path for horse and foot traffic only is eight miles shorter. Lansdowne was first constituted a permanent cantonment in 1887, during the Viceroyalty of the Marquis of Dufferin and Ava. The garrison now consists of two battalions of Garhwalis and two of Gúrkhas.

On 15th March, 1909, I left Lansdowne for Srinagar, Kashmir, and there completed final arrangements for the onward march of the expedition, including the buying of stores and impedimenta necessary for so extensive an undertaking.

From here I set out to break through the northern barrier of the Himalayas. I had experienced great difficulty in obtaining permission from the Government of India to proceed by the Gilgit route so early in the year, as it is not considered

open before the 15th May owing to the ever-present danger from avalanches, and to the road being blocked by snow, dangers which are by no means exaggerated. Thanks, however, to the assistance afforded me by Sir Francis Younghusband, K.C.I.E., then British Resident in Kashmir, these difficulties were finally surmounted.

The most dangerous parts of the Gilgit road in mid-winter are through the Zudkusu and Gurais Valleys, where the slopes are so steep that it seems hardly possible for the snow to lie on them at all. It is said that the vibration of the air caused by speaking is sufficient to bring down an avalanche. This is particularly the case in the Zudkusu Valley, so being undesirable of qualifying for an early grave we kept a discreet silence, holding ourselves in readiness to lower all previous records in the sprinting line.

It was an eleven days' march to Gilgit, crossing two snow-bound passes, and encountering huge avalanches and snow-slides constantly every day.

Near the Burzil Pass we had a narrow escape, one of many. It occurred as we were moving along a precipitous slope. Suddenly a huge avalanche came thundering down just as we were passing, cutting off myself and the orderly from the coolies following behind. It was a great rush for safety as the immense white mass came hurtling on in one irresistible sweep, bringing in its wake rocks, trees, and debris of all descriptions. Luckily the coolies were able to take shelter under the lee of a depression in the hillside, whilst I and Giyani were just fortunate enough to get beyond it in time to avoid being carried away. No power on earth can resist the onslaught of an avalanche as it crashes downward, gathering bulk as it goes, and sweeping onward with an ever-increasing impetus. Such perils as these are daily encountered by the hardy mail runners who maintain communication with the distant frontier post of Gilgit during the hard and inexorable winter. Theirs, indeed, is a hazardous task, carrying His Majesty's mail through the snows of the Himalayas, risking life hourly in the tremendous ravines and narrow necks of this wild and rugged land. There is no honour and glory attached to this onerous calling, only an ever-present danger from the swift and awe-inspiring avalanche, which knows no obstacle and spares no man. Should the post runner be engulfed he passes from mortal ken, unknown, unhonoured and unsung. Shortly before I passed through these dreaded ravines two of the post runners had been overwhelmed by an avalanche and buried alive. As I passed the spot I could not help pondering on their dreadful death, swallowed up in the merciless avalanche with no warning of the fate that was to overtake them. Beneath the snowy pall the bodies would rest until spring, when the warming influence of the sun would melt the snow and disclose the victims thus entombed.

From the northern side of the Burzil Pass six marches took me into Gilgit, a post of political importance commanding one of the routes from India to the Pamirs and Central Asia.

Gilgit lies to the north-west of Kashmir, and was constituted a Political Agency in 1889. Within the limits of this Agency are included Hunza and Nagar, the northern boundaries of which strike the point where three empires meet. The distance from Srinagar is over 200 miles, but since the construction of the military road it has, so far as the summer months are concerned, been shorn of many of its difficulties. It is a lonely sojourn in this distant spot, and the long winter cuts one off from communication with the outer world, often for two or three weeks at a stretch. But it has its compensating advantages, for few sporting localities rival the deep ravines and precipitous slopes which are the dominant note of this trans-frontier possession.

In Gilgit I stayed ten days, receiving much hospitality at the hands of the Political Agent and others.

Leaving Gilgit I pushed on through the Hunza Valley, to Baltit, which is the capital of Hunza, passing on the way the famous heights of Nilt, stormed during the Expedition of 1891.

The approach to Baltit is very fine, lying through terraced fields watered by irrigation channels, the valley shut in on either side by gigantic mountains. The capital stands on an eminence at the mouth of a grand gorge. Behind the Mir's castle the mountains rise to an enormous height, whilst towards the river it is a scene of orchards, now in the full glory of spring blossoms. The houses are built tier upon tier, and the castle of the Mir, which is reached through a number of steep and tortuous passages, crowns the summit, fitting home for a robber chief.

Hunza commands one of the routes to the Pamirs and Central Asia, and in this respect occupies a position of considerable importance. The Kanjutis, as the inhabitants are known, are much akin to the Chitralis, being a fine race of people with fair complexions. They are splendid mountaineers, possessing great powers of endurance, and would be invaluable if converted into irregular troops, work for which they are admirably adapted. They have ever enjoyed a fine reputation for bravery, and the incessant struggles with their neighbours of Nagar, and their raiding exploits, testify to the warlike qualities possessed by them to a marked degree. The passes to the east of the valley lead into the Raskum Daria, and on to the great highway of trade between Ladakh and Chinese Turkistan. In former days raids on caravans using this route were of frequent occurrence, and formed the main source of income to the rulers and people of Hunza. The Kanjutis, taking full advantage of the inaccessible nature of their mountain fastnesses, would cross into the Raskum Valley, rob passing caravans, and dispose of the captives as

slaves to the Chinese. The natural consequence of these raids was that entire valleys on the Turkistan side were depopulated, and the name of Kanjut became a byword amongst travellers. This state of affairs terminated with the subjugation of Hunza, brought about by the Expedition of 1891.

I halted a day in Baltit to explore the place and call on the Mir of Hunza. We had a long conversation, the Mir speaking fluent Hindustani, and proving himself an entertaining man. In the courtyard outside the Mir had his bodyguard drawn up for my inspection, a score of strapping, cheery ruffians, dressed in dark uniforms with red fezzes. The commander of this ferocious-looking squad was a tall swarthy fellow of most determined mien, wearing the full dress tunic of an officer of the Bedfordshire Regiment, but as to how he had acquired it did not transpire. He was armed with a long sword, and with a revolver stuck in his belt seemed altogether an individual of whom to beware. The men of the bodyguard carried old muskets, and impressed me as forming fine material for the fighting line.

Beyond Hunza the track leads through mighty canyons, rivalling those of the far-famed Fraser River in British Columbia, along precipitous ledges, and through the river a great many times. The going is exceedingly rough, and the nine marches from Baltit to the Chinese frontier are a prolonged scramble over huge "parris," or paths along the rocky face of cliffs, and boulders of giant proportions which strew the valley throughout its length.

On the night of the 27th April I reached the rocky nullah leading to the Mintaka Pass, by which one can cross into Chinese territory and on to the Pamirs.

There are two passes by which the Pamirs can be reached from the Kanjut Valley—the Kilik and the Mintaka. The former is the easier of the two, the ascent to it being gradual and practicable for laden ponies. The Mintaka lies to the east, and is therefore a longer route, the approach to it being steep and the going very bad over huge boulders. Both these passes cross the watershed of the Karakoram, and from the end of October until well on into May are closed to all but pedestrian traffic on account of the depth of snow, and communication is then only maintained by the Mintaka.

I decided to cross by the Mintaka, camping near the foot of the pass, intending to move at dawn the next day. It was snowing heavily, and the cold was intense, whilst the wind rising in fitful gusts drove the thick mist down the gorge, narrowing the field of view to a score of paces in any direction. On both sides towered precipitous mountains, whose summits were lost to view in the prevailing gloom, and prospects did not augur well for a successful crossing on the morrow. Moreover, two of my coolies were ill and unable to proceed further.

By dawn the following day the weather had cleared and the sun shone brightly. I doctored the two coolies as well as possible and left them comfortably installed under the lee of a huge rock, and then pushed on with the remainder of the men, who, after crossing the pass, would return to the Hunza side the next day. Higher up the ravine assumed a higher and more rugged aspect, until we reached an immense glacier which completely fills the upper end of the valley.

Thanks to the pluck and grit of my Hunza coolies, we were able to successfully negotiate this glacier and the thousand feet of scrambling over huge rocks and boulders leading on to the summit. The altitude of the Pass is 15,430 feet, and a cairn of stones marks the frontier line between British and Chinese territory. Standing there one realises that it is the meeting place of great empires, the point where one leaves the confines of civilisation and enters the weird and strange dominions of the Flowery Kingdom.

From the summit of the Mintaka, or "Pass of a thousand ibex," I expected to see before me a great tableland, this, I think, being the popular idea of the Pamirs. But the Pamirs are no tableland. Rather they comprise a succession of leads formed by the shale detritus which has accumulated through the ages, a mighty mass of lofty, high-pitched ridges and gables, with valleys, hollows or leads between, desolate and treeless, with a climate noted for its severity. They might also be compared to a succession of wide open valleys with gently sloping sides, the average elevation being some 13,000 feet, many of the intervening peaks running up to 20,000 feet and over. Both from a political and sporting point of view, the Pamirs have attracted a considerable amount of attention, though their military value is a negligible quantity. What are the origin of the Pamirs it may be asked? The term signifies an upland plain and embraces the mountainous region of a remote corner of Central Asia. Their origin rests somewhat in obscurity, but authorities on the subject, such as Sir Francis Younghusband, explain them as ancient glacier beds and the detritus of shale brought down from the mountains the streams have been unable to carry away.

The total area of the Pamirs is about 25,000 square miles, the greater portion being within Russian jurisdiction. The Taghdumbash Pamir, situated within the boundaries of the Chinese Empire, is the only one now available to European travellers since the Russian Pamirs were closed to foreigners some years ago—a rule Russia rigorously enforces, keeping jealous watch and ward thereover.

The chief object of interest attaching to this bleak and inhospitable region is the *Ovis Poli*, whose horns form one of the finest trophies in the sportsman's collection. This grand sheep, the largest of its class and the size of a donkey, carries long, curved horns, giving it a majestic appearance. Unhappily the

Ovis Poli is becoming all too rare owing to the depredations of wolves and the hunting Kirghiz, a double persecution which must ere long bring him to the point of extinction, and render a journey to the Chinese Pamirs for sport a futile one.

The people met with are the nomad Kirghiz, a tribe distributed over Central Asia, whose origin has been the subject of considerable speculation. These hardy nomads gain a scanty subsistence by herding their flocks on the bleak uplands of the Pamirs. During the winter, when the snow and intense cold render life on the higher ground impossible, they retire to the valleys, some of them migrating to the Afghan Pamirs, where the high wind sweeps the pasturage bare of snow, affording a meagre grazing. Their habitation are the "yurts," constructed of felt on a circular wooden framework, with an opening at the top to let out smoke from the fire lighted in the centre. The inside is carpeted with rugs and numdahs, and in the case of Kirghiz of the better class is hung with embroidered cloths and coverings, imparting an effect as pleasing as it is artistic.

The fuel in use on the Pamirs is yak or camel dung, which emits a pungent but not an offensive odour. There is another form of fuel known as "burtsa," a stunted scrub, the roots of which are inflammable and make quite a good substitute for wood. It is found in quantities along the valleys and collected by the Kirghiz for winter use.

The main articles of diet of the nomads comprise milk and mutton, while their chief beast of burden is the yak, an animal which can live at great elevations and endure intense cold but who dies in the slightest heat.

I remained a month on the Pamirs in quest of Ovis Poli, and then decided to move *via* the Ili Su Pass and the Yarkand River into the Kulan Urgu and Asgar Sai Valleys to Yarkand.

Very little is known of the Yarkand River beyond the fact that it is exceedingly difficult to travel down, its course lying through a mighty gorge whose sides are in many places absolutely perpendicular.

I therefore struck camp on 26th May and moved to the foot of the Ili Su Pass. The Kirghiz knew nothing whatever about the country beyond, so I could gather no useful information as to the route or the amount of water in the ravine.

The next morning, however, at 5 a.m. I pushed off. The way led up a rocky gorge covered with ice and snow, and near the summit was very difficult, but we ultimately reached the summit after some hours of stiff work, the altitude of the pass being 16,750 feet. On the far side is a grand ravine shut in by high rocky mountains falling away in perpendicular sides to the river banks. The going was far from easy, for at this season of the year the Ili Su, fed by the melting snow, is a rushing torrent of ever-increasing volume, and to ford it is a task of the gravest danger. Two days' marching took us to the junction with the Yarkand River, whence I moved down it

for some distance, but was later forced to retrace my steps, as the gorge was so narrow and precipitous and the river rushing with such terrific violence that any attempt to proceed further would have met with complete disaster. I therefore forded the river further up in the Raskum Valley with a view to crossing into the Kulan Urgu Valley by a route which had never been traversed before.

In the Ili Su Ravine I had found a nomad Kirghiz, who agreed to act as guide, and who said he was acquainted with the approach to the route I now proposed to follow; so confiding myself to his doubtful tender mercies we plunged into the unknown, and after many exciting incidents reached the summit of the Qotchkor Pass leading into the Kulan Urgu Valley. This Pass, which lay at an elevation of 17,400 feet, had an extremely steep ascent on the southern side, but the descent on the northern was worse, the summit being narrow and razor-backed, a huge snow cornice overhanging the edge. The only practicable path down was a narrow ledge certainly not more than 9 inches broad, which led down at a steep angle for some 30 feet, and thence by a long stony slope covered with frozen snow to the bed of the ravine, a distance of quite 2,000 feet.

I gave orders that a path should be cut through the snow cornice leading down at as gradual an angle as possible, and that the yaks should be assisted by all the men, of whom I had eight. This dangerous part we successfully negotiated, by which time it was 5 o'clock, and a dark misty afternoon. We were now on the frozen slope on the northern side. It went down at an appalling angle, and the shale was frozen solid, forming a glassy surface on which it was impossible for the laden yaks to maintain footing, some slipping 30 feet and more on the treacherous ground. It was already getting dark, a nasty cold wind setting in which turned everything into a state of frozen rigidity.

We had got the animals down some 50 feet, when one of them slipped again, and though desperate efforts were made to save him, they were futile, for the slope was like a sheet of glass, and continued so for fully 2,000 feet. Down he went, gathering terrific impetus, with his burden of boxes crashing after him, while above the yakmen wailed and wept, calling on Allah to save them.

Perceiving the situation to be one of imminent danger should they completely lose their heads, and as the shades of night were rapidly falling, I urged them to pull themselves together. I then had the remainder of the animals off-loaded and everything stacked on the slope, intending to come up the next day with a party of Kirghiz and man-haul everything down. We then battled on, and late that night were thankful to reach some yurts.

The following day, having assembled all available hands, I started back to the foot of the Pass in the hope

of being able to recover some of the lost kit (which unfortunately included some of my best negatives). In this work we were partly successful, the Kirghiz, under a most excellent Beg, or small headman, doing splendidly, hauling each other up with ropes and working away assiduously with their ice axes, and recovering amongst other things a bag of money, a commodity useful even in those wild parts. We found the yak fully 2,500 feet below the summit, wedged in between blocks of ice, with his head jammed in a tiny crevasse through which raced an icy cataract. He was in a mutilated condition, pieces of skin having been torn off from contact with jagged rocks, and several teeth missing, some of which the Kirghiz actually found during the subsequent search. The tremendous distance he slipped must have broken every bone in his body. Not a vestige of the two boxes attached to him remained, only the loading ropes still trailing by his side.

I spent a day in my camp below the pass drying everything, overhauling the kit, and generally preparing for the march down the Kulan Urgu Valley. The Kirghiz told me the latter would prove hazardous in the extreme owing to the rise in the river and the terrific current engendered thereby.

The trek through this valley was even more difficult and dangerous than the crossing of high and ice-bound passes, for at this season of the year the river is a roaring torrent fed from the snows above. It would be impossible in the time at my disposal to attempt anything approaching detail, so that I pass rapidly on, merely remarking that we did no less than 26 of such fords in one day.

From the Kulan Urgu Valley I crossed by the Kara Dawan or Black Pass and the Sandal Pass into the valley of the Asgar Sai, thence following the latter river to a point beyond its junction with the Yarkand, where we crossed it in huge flat-bottomed boats, and then entered the City of Yarkand, and a place of importance in the days of ancient Tartary.

Yarkand has a population of some 60,000 inhabitants, the great majority of Mohammedan persuasion, with a sprinkling of Chinese. It is one of the chief trading centres of Kashgaria, and from it roads radiate to Kashgar and Maralbashi on the north and north-east, whilst to the south lies the main trade route to British India, the latter giving to Yarkand its present day importance.

During my stay in Yarkand the Chinese Governor gave a banquet in my honour of a quality and quantity proportionate to the great man's dignity. The menu was varied and extensive, and included shark's fins, bamboo shoots, and bamboo roots, pigeon's eggs preserved in chalk, stag's tendons, lotus seeds, and sea slugs, the latter a delicacy possessed of as many legs as a centipede. Some strange tricks were played at this Chinese banquet, one of them being to hand round a lighted match stuck in the end of a match box, and the unfortunate

guest in whose hand the match goes out has to quaff more brandy, the result in some cases being highly exciting.

From Yarkand I rode 140 miles to Kashgar, where I was the guest of the Acting British Consul, Captain A. R. B. Shuttleworth, Indian Army. Kashgar is the chief city of Southern Chinese Turkistan, and from a political standpoint enjoys considerable importance, while since the Russians have accorded increased trade facilities to merchants from Russian Turkistan it has assumed greater prominence. The roads leading from the city to points on the Russian Central Asian Railway, distant about 220 miles, present no serious obstacles, so that trade prospers under the circumstances. Kashgar is similar to Yarkand, though its population is less, amounting to 35,000 or 40,000 in all. The province of Kashgaria has passed through troublous times, and been the scene of war and tumult which have left their mark upon the character of the people.

Prior to the revolt under Yakub Beg in the sixties of last century, the country had been devastated by constant rebellion against the Chinese, first one side and then the other gaining control. In 1877 the province again came under Chinese domination, and has since remained so. The Kashgarians possess no martial qualities, and as they have neither the power nor inclination to rule themselves, or leaders amongst them capable of conducting a revolution, are content to remain under Chinese government as being the lesser of two evils, where they are not unduly harassed and allowed to go their own way. The people rest happy in their present condition, showing no desire to improve it, and were a change to ensue it would probably not concern them.

One sees very little of the Chinese, who although the ruling race, do not represent more than 5 per cent. of the total population. They, in common with other towns in Turkistan, reside in a walled city of their own, distinct from the Musulman quarter.

Whilst in Kashgar I paid ceremonial visits to the leading Chinese officials, all of whom returned my call, and much impressed me with their charm of manner and evident desire to cultivate friendly relations with the British.

China appears desirous of consolidating her hold on the country, and since the Russo-Japanese War is awakening to a sense of her responsibilities and the latent power she possesses, realising that to get at the root of the evil she must purify her system of administration, corrupt and rotten to the core. This in a small way she is endeavouring to do, though time is needed to cleanse and remodel a system in vogue for centuries. With the formation of the new model troops, the management of the schools on modern lines, and reforms in the administration, signs are not wanting that China aspires to a place amongst the Powers. During travels in Chinese Turkistan and other parts of the Celestial Empire I met many Chinese officials who

showed a desire to raise their country above its present low level, some even holding advanced European ideas.

Time passed pleasantly enough during my stay in Kashgar, the Russians doing much to make it congenial. We entertained them to dinner one evening, the company including the Consul, the Manager of the Russo-Chinese Bank, of which there is a branch here, the two Cossack officers of the Consular escort, and the Postmaster, the latter rather an important individual in Russian eyes, dressed in a white uniform and carrying a sword. The dinner was a cheery affair, and passed off remarkably well, the guests enjoying themselves, especially the Postmaster, who was very entertaining.

A detachment of 60 Cossacks forms the escort of the Russian Consul, so I had an opportunity of seeing these much-vaunted troops. The annual reliefs had just taken place, a fresh troop from the Orghenbourg Cossack Regiment arriving. They gave one the appearance of being workmanlike, handling their rough ponies with considerable skill.

From Kashgar I started anew on the trek heading east across the desolate plains of Chinese Turkistan to Kuchar, a distance of 500 miles.

Time forbids my dwelling on this stage of the Trans-Asiatic journey, replete with much incident, so I pass to July 23rd, the date I left Kuchar to strike north across the eastern shoulder of the Thian Shan Mountains. This grand range runs east and west, and divides Kashgaria from the Ili Valley and Northern Turkistan.

The Northern slopes are much intersected by valleys and ravines, many of them covered with vast pine forests, the home of that noble stag, the Asiatic Wapiti.

The Chinese authorities wished me to proceed by the great road running through Urumchi and along the foot of the northern slopes of the Thian Shan to Kulja, saying that the route due northward from Kuchar was unknown, and that I should certainly perish in any attempt to travel by it.

However, I succeeded, after immense difficulty and meeting with numerous adventures, in crossing the range into the Great Yulduz Valley, concerning which little is known since the Russian explorer Prejaval'ski first visited it in 1873.

It was in the Yulduz Valley that I first encountered the Kalmuks, a strange and fascinating race of nomads with whom one comes largely in contact in the Thian Shan. In religion the Kalmuks are Buddhists, and their hair is worn in pigtales similar to the Tibetans. The type of feature is distinctly Mongolian, with almond-shaped eyes and prominent cheek-bones. In stature they are above the middle height, and are a fine looking race, always cheery, excellent hunters and good on the hillside. Whenever possible they prefer to be mounted, but are none the less able and willing to walk when out shooting, as their footgear is suitable for the purpose and

their attributes as hillmen of a high order. As in the case of the Tibetans, they evidently pay scant attention to the old adage that cleanliness is next to godliness. Nevertheless, they are a fascinating race of people, appealing strongly to an Englishman for their love of shikar and their sporting instincts.

The Kalmuks are divided into sections administered by officials appointed among themselves, the higher grades of those in the Ili Valley being nominated from New Kulja, the headquarters of the Viceroy.

The manners and customs of the Kalmuks are in many respects remarkable, more particularly in regard to the disposal of their dead. The corpse is put out on a hill or point in proximity to the camp and there left to be disposed of by the dogs and vultures. Should the body not be thus demolished within the space of three days, the departed is deemed to have led a wicked and wayward life, a presumption that is visited upon his relatives in the shape of a severe chastisement all round. Marriage plays an important part in the life of the Kalmuk, betrothals being arranged early in life, and scant regard paid to the wishes of the lady. A wedding is a great event, the bride being usually carried off by force by the suitor, to which arbitrary proceeding the parents make no objection. When interrogated on the subject, one of my Kalmuks afterwards told me should there be several aspirants for the lady's hand she generally manages to fall into the grasp of the swain she regards with the greatest favour. Ordinarily marriages are arranged and the girl handed over after the ceremonies connected therewith have been concluded. With regard to animal life, the Kalmuks have many strange beliefs. They tell one that the fox is of a black colour for 500 years, after which he changes to white for a similar period. At the close of a thousand years, having wearied of life and whiteness, he gladly dies.

Whilst in the Yulduz Valley I went to see the chief, or Khan, of the Kalmuks, as he is known. In connection with the Khan I afterwards heard a curious story. On attaining the age of 25 years he vanishes from this world, and a new Khan reigns in his stead. The mode of his disappearance from mortal ken rests somewhat in obscurity, but from what I could ascertain the end is brought about by means of poison. The present Khan, whose views on the subject differed considerably from those of the high priests and elders, being undesirous of qualifying for an early grave, had fled from the cares of State and gone ostensibly on a visit elsewhere. In this he showed a commendable amount of wisdom and circumspection, for not even the prospect of perpetual bliss in the society of other defunct Khans could tempt him to give up the ghost. Of a truth uneasy lies the head that wears a crown in the Yulduz Valley!

From the Yulduz I moved west to the Tekkes Valley, via the Tzanma, Jirgalan and Kok Su Valleys along a difficult trek,

during which we were constantly visited by midnight raiders and horse thieves, who flourish in this remote corner of the Celestial Empire. I, however, kept up a constant vigil, and on the whole kept them at bay.

It may be of interest to give a description of the Tekkes, the principal valley of the mountains in question. The river watering it takes its rise amongst the glaciers of the Thian Shan, near the peak of Khan Tengri, and having penetrated the rocky defiles below the frozen regions of its birth, emerges into this broad valley, whence it continues to flow eastward until joining the Kunges, the two streams, after union, being known as the Ili. The mighty river thus formed flows on past Kulja and into Lake Balkash, in Russian territory. The Tekkes, in its course of nearly 150 miles in Chinese territory, flows through a rich pasture land, a wonderful grass country that would afford unlimited grazing to countless herds of horses and cattle. In that part of the Tekkes Valley with which I am now concerned, the ground rises in gentle undulations from the river. The valley is everywhere carpeted with the same rich grass, whilst the hills to the south are covered with fir and pine, and above them stretch shining glaciers and the snow-crowned summits of the main range of the Celestial Mountains, the whole comprising a scene of unsurpassed grandeur, and one that would compel the admiration of the most phlegmatic.

I remained two and a half months in the Thian Shan, during that period securing many fine specimens of the Asiatic wapiti, ibex, roedeer, sheep, &c.

The Asiatic wapiti constitutes one of the largest representatives of the deer family, being only surpassed in this respect by his American prototype. Amongst the Chinese the stag's antlers have a medicinal value, so his pursuit is conducted with a persistency that at the present rate of extermination will soon cause him to become as extinct as the dodo. The Chinese pay large sums for a good pair of antlers, the price varying from 50 to 140 rubles in Russian money. The horns are reduced to powder, and then used by the Celestials for the cure of certain specific complaints, though as to whether any good results therefrom is a matter of doubt. Most of the Kazak and Kalmuk inhabitants of the Thian Shan possess rifles of sundry kinds, and unfortunately are all too successful in their quest of wapiti. This persecution is telling rapidly, and ere long one of the finest specimens of the deer family will have disappeared for ever from the pine forests of the Thian Shan in the same way as the bison has passed from the prairies of North America.

On leaving the shooting grounds in the Tekkes I crossed into the Ili Valley, and so to Kulja, a Chinese town situated some 40 miles from the frontier of Russian Turkistan and 850 miles east of Tashkend.

Kulja is the capital of the Chinese province of Ili, and is a walled town of some 30,000 inhabitants. I spent several days there, receiving much hospitality at the hands of the Russians, and passing an interesting time in this, one of the most important centres of Chinese Central Asia.

I dined several times with the Cossack captain commanding the Russian Consular escort, and he insisted on my lunching with them the day of my departure from Kulja. He had also returned my call in full uniform when I first arrived in Kulja, and appeared a fine-looking figure, in the becoming dress of the Siberian Cossacks, with an astrakhan hat of large dimensions. He was a very strict disciplinarian, and whilst I was in Kulja punished two of his men for being found intoxicated in the bazaars by an award of five hours pack drill per day for two weeks. This must have caused them to think a little and ponder on the respective merits and demerits of having a spree when such deserts awaited them.

From Kulja I trekked on to Suidun, another Chinese city to the west, where I remained a few days.

The main object of my halt in Suidun was to procure a special passport from the Chang Jung, or Viceroy of Ili, to enable me to proceed through the wild country of the Sairam Nor and Ebi Nor Lakes, and the region to the north thereof. The great man was, at the time of my visit, indisposed, and was therefore unable to receive me, but the passport was duly prepared and sent over with his compliments. It was a gorgeous document, 41 by 22 inches, covered with figures of lions and tigers and strange dragons, the text being in Manchu and Chinese, so if this formidable instrument would not impress the native, then I failed to see what would.

I called on the various Chinese officials in Suidun and received ceremonial visits in return. They were much interested in the journey onward to the Trans-Siberian Railway, but, in common with other Celestials I had met before them, one's coming so far for the sake of sport was an inexplicable problem, and they could not understand why one should undergo so much when there was no monetary benefit accruing, their views in this respect coinciding with those of the Kulja Amban.

The officer commanding the troops at Suidun also enquired if I converted the horns into medicine, this, according to his view, being the only possible use to which the trophies could be put, and being obviously dissatisfied with my reply, asked if I had been sent into this distant land of mountains and shikar to learn how to shoot. This was the limit in questions, even for a Chinese one.

At Suidun I was informed that shortly before my arrival the Amban in charge of the troops had been directed from Peking to submit a report on the musketry training of those under his command. He therefore paraded the garrison in the courtyard of his Yamen, where the gallant soldiery blazed off their

ammunition in the air, the while his Excellency sat down and smoked the pipe of peace. At the close of this instructive course of training the latest thing in musketry returns went in and an indent for more ammunition!

From Suidun I struck north *via* the Talki Pass to the shores of the Sairam Nor Lake, one of those vast inland seas dotting the map of Asia. It is a most desolate land at any time, but especially is this so late in November when I was there.

Whilst the caravan was busy loading up one morning I went over to watch some Chinese cavalry engaged in riding and other exercises on the plain near camp. There were 18 cavaliers under the command of an officer, and the parade was distinctly an original one. They each galloped in turn along a trench about 3 feet deep and 4½ feet wide, firing at three little mud targets placed on the parapet at intervals of 120 yards. The majority of these gallant cavalrymen were too busy hanging on to their mounts to trouble about shooting straight. They contented themselves with blazing away yards beyond the target, doubtless hoping to get out of it alive. Some of them did not fire at all at the first target, which amused the officer commanding immensely, he apparently regarding the morning's work as a huge joke, and the mere fact of no one scoring a hit did not seem to worry him in the least. The performance having terminated, they formed up and rode away, with colours and banners flying and all the panoply of war, well satisfied with the result of the day's labours, no checking of targets, or cleaning rifles, or any such essential details. Military training in Chinese Turkistan is obviously conducted on original lines!

North-east of the Sairam Nor lies the mighty Ebi Nor, 40 miles long by 20 miles wide. It was on the night of 25th November that I camped by the shores of this great lake. The cold was intense, and every day we experienced the rigours of an Arctic blast, such a wind as one only experiences on the bleak steppes of Central Asia.

My camp was not far from the Russo-Chinese frontier, and the Mongols informed me the country around was infested with robbers and raiders of all descriptions; in this respect resembling our own North-west frontier of India where battle, murder and sudden death are of all too frequent occurrence. The bandits of the Ebi Nor region come over from Russian territory, rob any passing caravan, and then return across the frontier again whither the Mongol levies cannot follow them. A few days prior to my arrival in this lawless spot two unfortunate merchants, returning from a bartering journey amongst the nomad tribes to the north, had been waylaid and robbed of their goods and chattels and their throats cut by the raiders, who had then disappeared across the border. I therefore held my battery ready, and should not have hesitated to use it had these gentry attempted anything upon us, as I was informed they would endeavour to do.

The entire country from the Sairim Nor to Chuguchak is full of horse thieves and raiders, since the route, as stated, lying along the frontier, they are able to indulge their raiding propensities practically unchecked.

To the north of the Ebi Nor I found wild horses, which were first discovered by the Russian explorer Prejavalski. They are extremely wary, their powers of scent and hearing being developed to a remarkable degree, so that I was not able to approach closer than about 450 yards. I gathered, however, they stood some 13 hands, and with their rough and shaggy coats were eminently suited to withstand the rigours of the Mongolian winter.

Both in the Thian Shan and the country north of the Ebi Nor one meets the Kazaks, a race respecting whose origin considerable doubt exists. Some ethnographical authorities incline to the belief that they are descended from Turkish tribes, who in bygone days marched through Central Asia, conquering the land and settling thereon. Later they became involved in struggles with neighbouring tribes, finally dispersing throughout Central Asia, and a large proportion of them have now become subject to Russia.

The home of the Kazak is the familiar "aul," or felt tent, of the same shape as those met with in the Pamirs and Mongolia. There are few good points about these people, but there is one way in which they appear to be superior to their Kalmuk neighbours, and that is in the matter of cleanliness, although their other drawbacks outweigh this desirable attribute.

The food of the Kazaks comprises milk, cream, mutton and horse-flesh, the latter being regarded as a great delicacy. The most popular article of diet amongst them is, however, "kumis," fermented mare's milk, the taste of which must certainly be an acquired one. I have sampled a number of beverages during wanderings on five continents, but have yet to meet anything rivalling "kumis." The drink in question is made in a leathern receptacle and frequently stirred until fermentation, when it is considered fit to drink. It has the reputation of being invigorating, and constitutes a staple article of diet. Whenever a halt is made at an aul, or a visitor arrives, he is proffered the flowing bowl and does full justice to it. There is no accounting for taste even in Central Asia!

Chuguchak in Western Mongolia, several days march through a land of ice and snow, was reached on December 3rd. Here I was entertained by the Military Governor of Tarbagatai to another Chinese dinner of 30 courses. My host wished to present me with a huge live wapiti stag as a parting gift, but as I could scarcely imagine a stag standing 13 hands following me in the orthodox fashion across the ice-bound steppes of Mongolia and Siberia, I declined the present as gracefully as possible.

At dinner the customary delicacies gracing a Chinese table were served, including roast sucking pig, sharks' fins, sea slugs,

stewed celery, stags' tendons, duck's brains, ligaments and eggs preserved in chalk, the latter distinguished by their age and antiquity, from which standpoint their edibility is regarded by Chinese gourmets. There were a great variety of other dishes, and, as I had the honour of being the principal guest, I was assailed with snacks from them all by my hosts, who desired to show their unremitting attention, which is the acme of Celestial politeness. The salads made of radishes and cucumbers were extremely good, in fact the cooking of all the dishes left nothing to be desired, although the ingredients of which they are composed in many cases severely tries one, so the dinner is not altogether an unmixed blessing.

On December 8th I resumed the trek eastward through Mongolia and across the Black Irtysh Valley, experiencing much trouble owing to the lawless nature of the country, and to the guides bolting on every occasion. An 8 days' march through a desperate land of rocks, wind and snow brought me to the shores of the Great Kesil Bach Nor, another mighty inland sea.

I halted at Wong, the principal settlement of this part of Western Mongolia, and situated two marches west of the Kesil Bach Nor, and saw a great deal of the Mongol Chief and the lamas there established. The former asked me how many days it would take him to ride to England, a question that was a poser, but I said at least a hundred, and that if he went by rail much less. Never having seen the railway nor being able to divine its purpose, he became more mystified than ever, so foreseeing my veracity might become doubted, I changed the subject. He enquired how many sheep and cattle I possessed, evidently measuring my status in this world by the size of my herds, and was much surprised when I owned to none. Future travellers in Mongolia would therefore do well to pose as owners of kine on a large scale.

The Mongols who form the population of this vast country are of average height, and have flat features, with almond eyes and prominent cheekbones. Their dwelling is the felt tent, the movable structure peculiar to the nomads of Central Asia and Mongolia. The food of the Mongol comprises mutton, milk and brick tea, grain being to them an unknown quantity. Brick tea forms one of the chief imports from China, and the Mongols use large quantities of it. The tea, in the form of bricks or slabs, is sliced off with a knife in the same way as one would take chips from a plank. The tea is made in water to which salt is added, and the beverage, mixed with milk or cream, is then stirred and boiled. The iron pot is only cleaned at long intervals, and then very cursorily, so that the resultant mixture is of a doubtful quality.

Meat when eaten is boiled or sometimes roasted over the fire, chunks of it being thrust into the camel or cow dung furnace, contact with the latter giving it a tastiness which it would lack were it prepared in less primitive fashion. Kumis is also a drink much in favour amongst the Mongols, and a form

of cheese made from clotted cream is met with in nearly every aul.

A Mongol does not trouble much about washing, so that he, too, evidently pays scant attention to the old adage that cleanliness is next to godliness. The operations of eating are performed with the fingers, on the principle that the latter were made before forks. At the close of the meal he wipes his hands on the skirt of his robe, the use of finger bowls and serviettes being dispensed with.

The religion of the Mongols is Lamaism, or Buddhism, and the clergy, or lamas, constitute more than half of the population. It is not within the province of this lecture to discuss the rise of Buddhism, but reference may well be made to its leading features. The advent of Buddha occurred five centuries before the birth of Christ, when he believed himself to be invested with a divine mission. This culminated in the promulgation of the religion, which spread through a large part of the Asiatic continent. The fundamental principle of Buddhism is contemplation, and among its precepts was the ordaining of celibacy, which caused the establishment of monastic orders composed of both monks and nuns. In the days of their inception these monasteries were undoubtedly the seats of learning and religion, but in course of time their influence exerted an adverse effect upon the people, and the tyranny of the priests and inequality of castes—to overcome which Buddha had striven—became reinstated. The spiritual and temporal head of Lamaism is found in the person of the Grand Lama of Lhasa, the centre of Buddhism, which, until the recent British political expedition there, had for years remained a sealed book to the outer world.

There is a temple in Wong, to which were attached over 300 lamas, all dressed in the customary robes of red and yellow. Their heads are shaven and they pass the day in prayer and reciting the incantations peculiar to Buddhism. Although celibacy is enjoined, immorality is rife amongst them, and from all accounts the lives of the greater portion are not on such chaste lines as their calling would demand.

I visited the temple and the buildings in connection therewith the day after my arrival in Wong, as I was unable to continue the march owing to bad weather and a hurricane which howled across the plain from the north-east. The temple was large and built of solid beams and mud plastering, the hall measuring about 80 feet square. At the far end a low flight of steps led up to a smaller chamber, containing relics brought from Lhasa, and beautifully carved bells of copper workmanship. The head lama, who showed me over, was a man about 30 years of age, with a villainous cast of countenance, a shaven pate and grimy paws, his robes no longer the same bright colours they once were. Over his right shoulder he carried an old blanket, matted with the accumulated grease and dirt of generations, as some additional protection against the inclemency of the weather. Altogether this high priest did

not possess that air of sanctity one usually associates with the religious orders, nor did he impress me as being the one to whom to apply when in need of spiritual relief.

From the shores of the Kesil Bach Lake I crossed a low intervening range into the Black Irtish River, where I camped on the night of December 21st with the thermometer at 25 degrees below zero, such a night as makes travelling a torture. When I moved again the next day fresh troubles arose, for the Kazak guides accompanying me were not sure of the proper route to follow, so I decided to march due east, a route leading us through a succession of rounded hills and on to a Kazak encampment, the occupants of which came out to stare at us as usual and to wonder what could induce one to be on the move in such weather. They were a wild, ill-mannered crowd of nomads, some 50 in number, and their felt auls were enclosed in walls of reed and brushwood brought from great distances to serve as a shelter against the winds which rage in this part of the world as they probably do in no other. All the nomads remain stationary during the winter months, and their dwellings are constructed on the same principle as the one previously described, whilst some of those who inhabit a wooded country build log huts for occupation during the winter, for even the best of auls cannot keep out the terrific cold. The danger does not, however, lie in the rise or fall of the thermometer, but in the searching wind which nothing can resist.

To tell in full the story of the long march from India to the Siberian Railway across high mountain ranges, over desert plains and across the mighty steppes, encountering strange nomad tribes and experiencing innumerable incidents and adventures, requires a volume.

The time at my disposal will now only permit me to say that on leaving the Black Irtish River, where my caravan men mutinied, I pushed on north of the Black Irtish Valley to the Great Altai Mountains, one of the principal mountain systems of Asia, running east and west and stretching far out along the northern side of the desert of Gobi. The term "Altai" signifies gold, and the precious metal undoubtedly exists there in quantities. The formation of these mountains consists of clay schists and granite along the higher ground, whilst lower down and along the base sand and gravel and deposits of a similar nature have been left there by floods in bygone ages.

From the zoological point of view, the Altai are notable as being the home of the *Ovis Ammon Typica*, the true wild sheep of Mongolia, an animal carrying large curved horns, which give it an imposing appearance.

The Chinese Governor of the Altai and Western Mongolia resides in the new town of Shara Sumbe, and we exchanged calls. He was much interested in my rifles and shot gun, asking several questions, also sending for his own battery, which comprised a rifle and gun, both of German make, for my inspection. We

then discussed the Boxer troubles of 1900, in which he took part, showing me a bayonet wound he had received in the forehead from one of the rebels during the fighting before Peking. His remarks were very amusing, particularly with regard to looting, my guest demonstrating them by rushing round the room and stuffing his pockets with my goods and chattels, as an illustration of how it was done. He eulogised the British, American and Japanese contingents, extolling their marching and campaigning abilities as of a high order.

Shara Sumbe lies in the foothills of the Great Altai, at an elevation of 2,850 feet above sea level. The town is founded on the site of an ancient monastery wherein formerly dwelt many red and yellow robed lamas, but the monastery has now given place to the new town established by the Chinese with a view to consolidating their hold on Western Mongolia and the Altai region generally.

As it was now the end of December I determined to proceed east up the Black Irtysh Valley and over the eastern shoulder of the Altai into Kobdo, and thence north to the Siberian Railway. It was whilst on this trek that we were caught in a terrible blizzard, practically my entire caravan of 10 men and 16 horses being crippled. We were lucky to reach the shelter of some yurts late at night in a parlous condition, my orderly's hands and my cook's nose and cheek being severely frost-bitten, while the others had various parts of the body frost-bitten. The terrific blizzards are of frequent occurrence on the Mongolian steppes, and in them lies the danger. The mere fact of the temperature dropping to 45 degrees below zero is not in itself the greatest hardship. It is the wind accompanying it, a wind that knows no obstacle and spares no man.

Twelve dreadful days of trekking supervened to the Russo-Mongolian frontier, where, on the 9th January, I discovered a small outpost of the Czar's Empire. My own flesh had become mortified, and the daily washing and dressing in carbolic of the raw flesh was something the memory of which will remain as long as life lasts.

Zaisan, the little military post in question, lies to the south of Nor Zaisan, another of the great Asian lakes. Here I remained one month whilst undergoing treatment at the hands of a Russian doctor; my orderly also received every kindness and attention. With their knowledge of frost-bite they were able to save his hands, though the marks will remain for many years.

On 7th February I resumed the northward journey across the illimitable steppes of Siberia, travelling by means of sledges. The cold was intense, the thermometer often sinking to 45 degrees below zero. On the morning of the 8th we arrived at one of the post-houses, literally stiff with the cold, despite innumerable fur coats, felt boots, felt socks, woollen "rizais," and blankets. There had been a

strong wind blowing through the night, and this had added to our difficulties in keeping the merest semblance of warmth, just sufficient to ward off frost-bite. When we arrived at the post-house just alluded to I felt my left foot numbed and lifeless, and when I pulled off the felt boots and stockings it was quite white and insensible to several digs I gave it with my knife. The starosta, or man in charge of the post station, then came in and rubbed it vigorously with snow and vodka, the latter being considered an excellent remedy in such cases. Gradually he got life into it again, but it was more than a month before it was restored to its normal condition, the whole of the skin peeling, and places where I had pricked it with the knife festering badly, which later necessitated my halting three days in Ustkhamenogorsk to allay the swelling.

Siberia is a bad country to travel in in winter, and the starosta was much amused at my remarks on the climatic rigours of his native land. He told me one might be the Czar of all the Russias, but little King Frost cared for that!

The great feature of a post-house is the ever-prominent samovar, which is a brass urn with a chimney down the centre, the space beneath being filled with a charcoal fire. The teapot contains a strong brew of tea, and a little poured into the glasses is diluted with hot water from the samovar. The tea is always drunk from glasses, without milk, and generally flavoured with a slice of lemon. The samovar is a popular institution in Russia, and is constantly in evidence, amongst rich and poor alike, so that although one can obtain little else in the post-houses along the line of route, this is ever to hand. Food in any shape is rarely obtainable, as travellers are expected to carry their own, but one can occasionally get a few eggs and a supply of the black bread, the staple diet of the Siberian peasant.

The men in charge of the post stations are usually moujiks, with shaggy beards, sheepskin coats and caps, and wearing an air of savagery in keeping with their attire. The women one sees are distinctly plain and dull, with enormous waists and unduly large feet, which, if it does not add to their personal charm, enables them to keep a good hold on the country.

None of the people are ever in a hurry except where officialdom is concerned, and then all are galvanised into activity, bustling about to an extent that shows the awe in which the ruling classes are held. To the energetic Britisher, accustomed to promptitude and despatch, the delays often met with and the lack of energy displayed are most exasperating. If a thing requires to be done the reply is "Séchas." Now the definition of this word as given in the dictionary is "within the hour," its idiomatic rendering being "immediately," but in practice it means "to-day" or "to-morrow," or within a lifetime if one is lucky. It is the first word one learns on entering the Russian Empire and the last one hears on leaving it. There

are other words in the language dear to the heart of the slothful Russian, but "Séchas" heads them all, and when he quits this mortal coil the last word breathed to the unwashed multitude around the bedside is "Séchas."

Northwards of the western shoulder of the Great Altai Mountains I passed through a region rapidly becoming rich and prosperous from its trade with Mongolia and the presence of gold in the Altai Mountains.

Siberia is undoubtedly a country with a great future, and in this respect the mineral wealth it holds will play a prominent part. The latter is distributed throughout the country, the region east of the Baikal Lake being prolific in gold, whilst that portion of the Altai Range which lies within the boundaries of the Russian Empire is known to contain the precious metal in large quantities.

The Altai are the private property of the Czar, and the difficulty experienced in obtaining concessions to exploit the gold area has acted as a deterrent in mining enterprise, although there are at the present time a number of companies engaged in the industry, but it has not yet assumed the proportions to which its importance and the amount of gold in the land demands. Whilst in Ustkhamenogorsk I was shown nuggets and gold dust obtained from the neighbouring districts, and from my own observations and enquiries made on the southern slopes of the Altai and whilst passing through Western Siberia, gathered there is every indication of gold being found in considerable quantities, and more than sufficient to warrant its careful exploitation. Besides gold, copper is also found in the country, as well as silver, platinum, galena, coal, and numerous products which only need working on modern lines for them to develop into thriving industries.

Several million pounds' worth of gold are exported from Siberia annually, but this is no criterion as to the true output, since a large amount is stolen by the miners and others, and only a comparatively small part of what really issues from the mines finds its way to the proper destination. Within recent years much progress has been made in the mining industry, and facilities, though meagre and by no means sufficient to meet up-to-date requirements, have been granted to parties of mining experts with a view to opening up the country and developing this most important part of its hidden wealth, but much yet remains to be done in this direction.

I halted a few hours in Barnaul, a town of 40,000 inhabitants, to get a substantial meal and snatch some much-needed rest, and then with fresh horses and sledges continued the journey at two in the afternoon.

All the drivers were now Siberians, fine stalwart fellows, and they handled the teams in a manner that compelled my unqualified admiration, for they took us over the steppes at a speed worthy of the chariot days of Rome. The roads were

in good condition from the heavy snowfalls and hard frosts, so that the iron shod runners on the sledges glided over the surface at great speed. They are hardy people, these dwellers of the steppes, inured to the rigours of the Siberian winter and capable of undergoing much hardship.

North of Barnaul there is a good deal of forest country, and wolves, a creature inseparably associated with sledge travelling in Siberia, were said to be common there, but on this occasion they failed to show themselves. We have all heard of onslaughts committed by fierce and hungry wolves in the gloomy recesses of the Siberian forests as they pursued the sledge of the traveller; the horses at a mad gallop born of despair; the occupants sitting grim and determined, striking down members of the howling pack, who nevertheless prosecuted the chase with that relentless energy so characteristic of this fierce denizen of the woods. I was not, however, troubled with their attentions, and thus the romances I had read in childhood days were not borne out in reality in after years on that long drive through the vast and silent forests of Siberia.

From Barnaul it was still a considerable distance to the Siberian Railway, through scattered villages, where everything, including the market produce, was frozen solid.

In the late afternoon of February 16th I reached the final stage which was to bring me to the Siberian Railway, and the end of the trans-Asiatic journey. From here the winter road follows along the Ob River, and less than an hour's run over it revealed the lights of Novo Nicholaevsk in the distance, the little station I was heading for. The great trek was drawing to a close. Further on we crossed to the left bank of the river, and passing the fine bridge which here spans it drove into the town and up to the post-house, which was full of other travellers, so we had perforce to be content with the entrance hall which the proprietor transformed into a bedroom for the time being.

A delay of 30 hours ensued here whilst awaiting the arrival of the Trans-Siberian Express. As I drove to the station I realised the long trek was at an end. For nearly a year I had been marching across mountain ranges, over interminable plains, and across the mighty steppes of Mongolia and Siberia, lands of desolation as they might well be in mid-winter. I mentally reviewed the results of such an undertaking, the trek over the Pamirs, the superb shooting I had enjoyed, the strange and interesting races of nomads encountered, the journey accomplished that no man had ever done before.

We rattled into the courtyard and drew up at the station entrance. Already my little orderly was busy bundling out our traps in readiness to place on board the Moscow express. My thoughts travelled back across the weary wastes to the Roof of the World, the smiling valleys of the Thian Shan. I forgot the hardships and the toil of nigh 4,000 miles of trekking, forgot all I had endured, and wished only that I might some day return

to enjoy again such shooting as had fallen to my lot in the heart of Asia.

But I was awakened from my musings by the clanging of the bell, warning all to step on board. The last good-byes were said and the next moment the train rumbled out of the station over the silent snow-covered wilderness on the way to Moscow and—England. The great trek was over.

Captain CHAS. SLACK (late Middlesex Artillery):—I fear I can say very little as to the lecture, and nothing indeed about India, but I should be glad to hear someone who can speak in reference to the journey Lieutenant Etherton has so well described to us. I can only speak of Siberia, and it appears to me that the lecturer got on to the Siberian Railway somewhere between Taiga and Irkutsk, and then went on to Moscow. I travelled over the Siberian Railway right away to Vladivostok two years ago, and I can bear out what the lecturer says with regard to the hospitality of the Russians. A more hospitable people could not be found. Whilst waiting for the train at Chelyabinsk, on the frontier line dividing Asia and Europe, at one o'clock in the morning, I was asked if I had a *plats kart*, that is a ticket to carry me on when the train arrived. I told the Russian officer, who asked me, that I had not, and he said: "Oh, you must have one or you will not be able to ride in the train," and he took the trouble to get one for me, and I was able to proceed. He and his comrades received me most hospitably. When they found I was connected with the army, they said: "Come into our compartment and have some Vodka; anything we have is quite at your disposal." We had a most pleasant time right on to Irkutsk, where they left me. One of them had then to travel two thousand miles further to Yukutsk—I went on to Vladivostok. The lecturer spoke of the difficulty of getting photographs. That might be the case in Turkestan, but I found no difficulty in getting photographs in Siberia, and even had the pleasure and good fortune to take the photographs of the three Russian officers I travelled with. I mention this because I think many people, who have not been to Russia, form an idea of Siberia and Russia that is a mistaken one. My experience is that it would be difficult to find a more hospitable people, and when they are run down, I can only regard it as a libel.

Lieut.-General H. D. HUTCHINSON, C.S.I.:—The only comment on the most interesting discourse to which we have listened that I desire to make, is that whereas the rules of this Institution limit the duration of a lecture to one hour, Mr. Etherton has held our attention for rather more than an hour-and-a-quarter. But I believe that I only express the sentiments of all present when I say that had he gone on for yet another hour we should have been interested all the time. His account of his travels and experiences is as interesting as anything of the kind we have ever heard in this Hall, and is, besides, a straightforward narrative of remarkable enterprise, pluck, and perseverance. The photographs thrown on the screen for us were, I am sure you will agree, remarkably good and illuminating. Anyone who has been in the Himalayas will admit that they convey a most graphic idea of the country explored, and of the difficulties and hardships encountered on such an expedition as Mr. Etherton has successfully accomplished. I am very glad, as a member of the

Council of this Institution, to have this opportunity of expressing our appreciation.

Mr. J. W. S. MILLER :—I should like to have heard a little more about gold in Siberia. With regard to the Altai and other property, I understand it is not really the Czar's private property any more than the Duchy of Lancaster is the King's private property. Having been a good time in Russia, I thought the lecturer might have some information on one point. The reference to the Mongols in Central Asia, and the rebellion under Yakub Khan, seemed rather a hit at the Russians, because the provocation was very great. Irkutsk, and a great part of Siberia, was considered to be very seriously menaced by Yakub Khan, and intervention was rather an important matter.

Lieutenant ETHERTON, in reply, said :—With regard to what Captain Slack has said about the hospitality of the Russians, I can fully endorse his remarks, because I have never met a more hospitable people. I should like to say now that it is entirely due to the care and attention the Russian authorities showed us when we were affected with frost bite that we owe the restoration of our hands and legs. They showed myself and orderly every attention, and were exceedingly kind and hospitable. I cannot speak too highly of their attention. With regard to the rebellion and the Altai property, I merely stated what I myself heard in Siberia. I think you will find the statement of the Altai being the property of the Czar endorsed in a standard work on the subject, viz., "The Official Report on the Industries of Russia," by J. M. Crawford, U.S. Consul-General to Russia, and that considerable difficulty is found in obtaining concessions. It is a point, of course, on which I cannot venture to say anything more. The usurpation of authority by Yakub Khan took place in Eastern Turkestan. The rebellion in Kulja, in 1871, was a rebellion against the Chinese. One thing followed another, the inhabitants took to killing each other, and finally Russia stepped in to restore order. The country was held for a period of ten years, after which—peace and tranquillity having been re-established—it was ransomed back by the Chinese, who, of course, occupy it now. If there is any hit at Russia or anything wounding Russian susceptibilities in any way, I am sure I was not aware of it.

The CHAIRMAN (Major-General Sir T. Fraser) :—I am sure you will agree with me that we have had a very charming and interesting lecture to-day, well delivered and admirably illustrated. We need not despair of our Race as long as there are men who undertake these enterprises solely for the sake of the deed itself. In Elizabethan days I think most Englishmen were adventurers. They are less so now, partly because the area of the unknown narrows every day. There are still, however, many who live up to the spirit of the Elizabethans. From the point of view of military and naval training, adventure is an admirable school, and also a means of gaining intelligence for which statesmen and diplomatists may well be thankful. I am sure I may say on your behalf that we are very grateful to the lecturer, and congratulate him on the success of the great and painful efforts it cost him, to collect the information you have been so fortunate as to hear to-day.

THE PHYSIOLOGY OF THE MARCH.

A Lecture delivered at the Staff College.

By *Lieut.-Colonel C. H. MELVILLE,*
Royal Army Medical Corps.

Professor of Hygiene, Royal Army Medical College.

I WILL take as the text of this paper a quotation from the Field Service Regulations of the German Army, which emphasises somewhat more strongly than do our Regulations the paramount importance of this subject.

Paragraph 303 of the 1900 edition runs as follows:—"By far the most important factor affecting the efficiency of troops for war is their power of marching. The march is the keystone of all operations, and the success of every undertaking depends very largely on the accuracy of the arrangements made for its performance. In many cases the arrival of a body of troops at the right place, at the right time, and in good fighting trim, may be the decisive factor in the situation."

I may be thought to be stepping somewhat out of my province in quoting the above regulations, which, of course, refer to marching from its purely military aspect; but I do so of set purpose, for important as marching is to the soldier as a soldier, it is just as important to the soldier as a doctor. Of all the causes which tend to lower the resisting power of the soldier, none is more important, none has greater effect, and none is more inevitable than marching. A commander may save his men from hunger, he may save them from thirst, and he may protect them from exposure, but march they must, and his aim must be to nurse their natural resisting powers to the utmost of his ability by sparing them as much as he can. To quote again from the German Regulations, para. 306, says:—"However well trained troops may be in the art of marching, they cannot be expected to continue efficient in this respect unless they are spared every demand on their powers of endurance not absolutely necessitated by the object for which the march is made." To do this, to spare them these unnecessary demands on their powers of endurance, it is necessary to understand the physiology of the march, that is the effect

that the act of marching has on the bodily economy of the soldier.

If these effects, and the mechanism by which they are produced, are thoroughly understood and constantly remembered, the march may be a cause not of reduced but of increased powers of resistance.

I propose to consider the question of marching under two aspects:—First, the effects of marching pure and simple, under ordinary service conditions; and secondly, the effect of prolonged and continuous forced marching.

First, then, I will begin with marching pure and simple, and will, to clear the ground, give a definition of what I intend by the word marching. Marching, then, means walking; wearing certain clothes; carrying a certain load, disposed on the body in a certain manner; at a fixed pace, regulated, not by the physical necessities of the individual, but by the average physical character of the body of troops of which he forms a part. That seems rather a complicated way of stating a very simple fact, but I think it will be admitted that all the above particulars are essential to the idea of the marching soldier as distinguished from that of the walking civilian, and it is these particulars which so differentiate the two that constitute the problem of marching as apart from mere walking.

I propose to discuss the above definition step by step, and will, therefore, begin with the first word—walking. Walking is the result of muscular effort; that is, it is caused by the contraction of certain muscles. When a muscle contracts, that contraction is accompanied by two phenomena: visible movement and heat. Now, I wish it to be understood that the contraction, the heat, and the visible movement are all absolutely interdependent, and essential to each other. You cannot have any one of the three without having the other two. You cannot have the heat without the contraction, and the movement, nor can you have the movement without the contraction and the heat, and so on.¹ I will give you an exactly parallel instance. Those who have driven, or had any acquaintance with petrol motors, or other internal combustion engines, know that the visible motion of the piston is due to the combustion in the cylinder of a certain amount of petrol vapour, essentially carbon and hydrogen, and the consequent expansion of the gas, with the production of heat. Now, I want you to understand that these two phenomena are absolutely and entirely similar. In the case of the muscle we have, as the result of a nervous impulse, which corresponds to the ignition spark of the petrol engine, the combustion of certain constituents of the muscle, consisting essentially of carbon and hydrogen, the con-

¹ There is, of course, the exceptional case where a muscle contracts against an insuperable resistance, and no movement results; but the rule holds generally good.

sequent contraction of the muscle with the production of heat, and as a result the visible movement. The point to which I particularly want to direct your attention is the absolutely essential character of the heat produced. There can be no muscular action without the production of heat, any more than there can be an explosion of petrol vapour in the cylinder of a motor car without the production of heat. Now, if one group of muscles only contract, as when I bend my arm, the production of heat is so comparatively slight that it is absorbed by the blood stream, and distributed throughout my body without materially raising my temperature; but though the heat produced is insufficient to raise the temperature of my body perceptibly the heat is still there; and it can, with suitable instruments, be measured in the substance of the muscle that produces it. In addition it is proportional to the work done. The case becomes, however, very different if we consider the movement of a large number of muscles, and repeat this movement several times, as in the case of walking, rowing, or running. The heat produced in these processes is now so great that it raises the temperature of the body as a whole. To give you an actual instance. In a series of observations made in 1906 by Dr. Pembrey, of Guy's Hospital, and Captain Parker, Royal Army Medical Corps, at Aldershot, on soldiers marching under varying conditions of load carried, clothing, and so on, the temperature of the men was taken on 359 occasions before and after marching. The temperature of these men was found to have risen on an average to 2.3° Fahr. above normal. This rise in temperature is purely physiological. It is the absolutely essential accompaniment of the exertion necessitated by the march. Now, it is obvious that if the muscles are continually producing heat, one of two things must result: either the temperature of the body must rise to such an extent that further exertion would be impossible, or the heat must be dissipated in some way or another. Ordinarily, the latter is the case.

The heat developed in the muscles is carried by the blood stream to the surface of the body, where it passes off in three ways:—By the evaporation of the moisture of the breath; by direct radiation and convection from the skin; and by evaporation of the moisture of the perspiration. Of all these the last is by far the most important; that is to say, the heat produced by marching is got rid of, or dissipated, more by means of the evaporation of the perspiration caused by the exercise than in any other way. As I say, ordinarily this occurs, but if in any way the evaporation of the perspiration is interfered with, owing to the air being too damp to take up more moisture, or the body too thickly clad to allow of the moisture evaporating rapidly, the temperature of the body will rise to an injurious extent and a state of "fever," tending eventually to heat stroke will be produced. I will return to this later. What I want to

emphasise at this point is, that the rise of temperature caused by marching is normal and inevitable, and, in addition, beneficial and necessary, and that it is, under ordinary conditions, passed off from the surface of the body by evaporation. I will return to my analogy of the motor car. As all no doubt know, after a car has been running for a short time the cylinder becomes so hot that special arrangements have to be taken to cool it. These arrangements consist of a system of water circulation, which removes the heat from the cylinder, where it is produced, to the radiator at the front of the car, where the heat passes off from the water by convection. Now, all who have driven cars know that this heat is an absolute necessity, and that till a certain degree of heating is attained, the car will not run its best; also that when everything is running smoothly the temperature once attained is kept constant. The two cases are absolutely parallel. In both man and the motor car you have a certain amount of energy produced, and as a necessary concomitant of that energy, heat. In both this heat is removed from the place of its production, in the one case the muscles, in the other the cylinders, by a circulating fluid; in both the heat is conveyed by this circulating fluid to the surface of the engine, and there dissipated to the surrounding air, by evaporation in the case of man, by convection in the case of the motor car. And in one case, as in the other, if you interfere with the dissipation of heat, by the skin or the radiator, as the case may be, you produce an overheated condition of the engine, which in man we call "fever," or heat-stroke, and in both cases you lay the engine open to further serious injury as a direct consequence of this overheated condition.

Now, the great difference between the civilian walking and the soldier marching is, that the former is at liberty by varying his clothing, his pace, and the load he carries, not only to minimise the production of heat, but to facilitate its dissipation, while in the case of the soldier such liberty is necessarily denied.

If you will turn to the definition of marching, which I gave at the commencement of this paper, you will find that everything that comes after the word "walking" refers to conditions which either add to the amount of heat produced in marching, or interfere with the proper dissipation of that heat. Thus, for instance, the load carried increases the amount of work done, and therefore, the amount of heat produced, the fact that certain clothes have to be worn interferes with the proper dissipation of that heat. Now, I wish to point out that the factors which interfere with the dissipation of heat are more important than those which increase its production, and, at the same time, are far more under control. As long as the heat produced by marching is allowed to escape freely from the surface of the body, no exertion, which the soldier is ordinarily called upon to undertake,

will cause any material rise of temperature above what is normal and permissible.

The chief factor which increases the production of heat is the load carried and the way in which it is carried. I have drawn a diagram (Plate I. [a]), showing the effect of increasing the load on the production of heat. The observations were made on the same man, over the same ground, on two different days, of approximately the same temperature. On the first occasion the man was in drill order, and his temperature rose less than half a degree Fahrenheit; on the second he was in marching order, and his temperature rose almost a degree. This experiment was carried out in the Long Valley at Aldershot over practically level ground, the load, therefore, had merely to be carried, not lifted. Of course, on a hill side this would be very different, as the work done would be increased by the number of pounds the man had to lift through each foot of the ascent. Every superfluous ounce of weight that a man carries has a definite effect in increasing that man's temperature, and though the increase may not, as long as the load is fairly light, or the march fairly easy, be of any great importance, it must be kept in mind that every successive ounce has a greater effect in raising the temperature than the ounce that went before it, and that this progressive increase gets relatively greater as the weight mounts up.

To show the influence of the weight carried, and the manner in which it is carried on the energy output of the soldier, it has been calculated that the work done in carrying 20 lbs. in the hand is three times as great as if the weight were carried symmetrically on the shoulders. The accuracy of this calculation has been confirmed by several observers.

If the load be materially increased to, say, 60 lbs., and the march increased in length, and especially if the other conditions of weather, etc., be unfavourable, the temperature may rise very considerably. Thus the German physiologist Zuntz records that a load of 68 lbs. on a march of 15 miles sent the temperature of the men under observation up to 102.5, and in one case as high as 104. He states that the men whose temperatures were 103 and over had flushed, purple faces, a vacant, unseeing stare, and were obviously on the verge of breaking down. He also adds the interesting note that a load of 48 lbs. on a very hot day, has the same effect in raising the temperature as a load of 68 lbs. on a cool day. The way in which the load is carried is, of course, of enormous importance. A badly balanced load means constant muscular effort to maintain the equilibrium of the body; constant muscular effort means constant production of heat, in this case unnecessary heat. For this reason the weights should be as close to the centre of gravity of the body as possible. The centre of gravity of an unloaded man, is a little below the navel, and vertically below the point of the shoulder. Any weight placed on a man's back

at once displaces his centre of gravity to a greater or less extent, and the greater the distance to which his centre of gravity is displaced, horizontally or vertically, the greater the effort he has to make at every step to accommodate his muscles to the new conditions; the greater the effort the greater the muscular strain, and the greater the muscular strain the greater the unnecessary evolution of heat. The total weight carried by a man, and more especially any additions to that weight must always be considered in relation to the actual body weight of the man himself.

Take the average man as being 10 stone or 140 lbs. when unloaded, it is obvious that the whole internal economy of that man is regulated by the fact that his muscles have, as a rule, that weight of flesh to move along the level or up hill. If to this live weight, to which his muscles are accustomed, you add dead weight, you are asking those muscles to do extra work, to which they are unaccustomed, and which at first they will do uneconomically. As long as the load is not too heavy, practice will train the muscles to accommodate themselves to the new conditions; but there is a certain limit, different for each man, but regulated a great deal by his body weight, beyond which no amount of practice will enable him to carry the load, and still keep sufficient store of energy in hand for any other purpose. That is to say, the carrying of the load becomes his main function, and the power of fighting becomes subsidiary to it. What that limit is has not, so far as I know, ever been actually determined by experiment. It is probably, however, about one-third of the body weight, say 50 lbs., which is roughly the weight carried by our infantry soldiers.

The temperature produced is affected not only by the load carried but also by the pace at which it is carried, and in two ways. In the first place it is obvious that if you carry a certain load a certain distance in 10 minutes, and again do the same in 5 minutes, you produce an equal amount of heat on both occasions, since you do the same amount of work on both occasions. On the second occasion, however, you have only half the time to dissipate the heat produced, which naturally accumulates in the body to that extent. There is, however, actually a greater amount of heat produced, for the following reason:—The human engine, like all other engines, has a normal speed at which it does its work with the greatest economy. Any variation of that speed, either above or below the normal is uneconomical, and more heat is produced relatively to useful work done in either case. As an illustration I would remind you of how much more tiring it is to walk at a pace accommodated to that of a child, than it is to walk at your normal pace.

The fact, therefore, that a man has to accommodate his pace to that of his comrades, affects the amount of heat produced, in comparison with the amount of useful work actually done, because the work is done less economically. Every man

has his own pace at which he can cover the ground with the least trouble to himself, any variation in this pace, whether in the direction of accelerating or retarding, increases the amount of heat produced for work actually done.

Other conditions also increase the amount of heat produced. Thus a tired man works less economically, burns more fuel than is, than a fresh one, and the heat produced in the body of a footsore man on the march may be as much as 10 per cent. higher than that produced in a sound man over the same distance.

We now come to the conditions which interfere with the proper dissipation of heat from the body, of which the principal are: first, the clothing; secondly, the fact that this clothing has to be of uniform character, and cannot be varied to suit personal idiosyncrasies, or beyond certain rather narrow limits, to correspond to the variations of the weather; thirdly, the fact that the man has to march in a mass of other men; and lastly, the weather—that is, the temperature and moisture of the air. All of these, with the exception of the weather, are, of course, more or less under control.

To begin with clothing. All clothing, naturally, interferes with the dissipation of heat from the body, which is the obvious reason why men strip to hard work. It interferes with the dissipation of heat because it interferes with the evaporation of the perspiration and with radiation. Even a very slight difference in the amount of clothing carried will make a very great difference in the rise of the temperature of the wearer. For instance, the same five men were marched from the Cambridge Hospital to Pondtail Bridge and back, on two occasions, in drill order, the only difference being that in one case they wore their jackets, and in the other case they did not. In the latter case their temperatures rose one degree Fahrenheit, in the former one degree and a half. This was the same march as that referred to when I was speaking of the effect on the temperature of increasing the load carried, and it will be seen, Plate I. (c), that the additional heat accumulated in the body, as the result of wearing a jacket on a warm day, was about equivalent to carrying a load of 30 lb. on a cold day. A rather important fact. I think the obvious corollary is, that since men wear their jackets they should not only be allowed to, but ordered to open them as much as possible. It is astonishing to me how often you see this not done on manœuvres. With our present infantry equipment this is easy, and one of the greatest advantages in that equipment is, to my mind, this ability to throw open the coat and expose the large evaporating surface furnished by the skin of the chest to the air. In any well-considered equipment there should be no band or strap crossing the body above the waist belt. All straps or bands should be vertical. The coat can then be thrown freely open, and I should, in addition, like to see it provided with buttons, so that the opened flaps could be buttoned back. For the same

reason it would be an advantage if sleeves were capable of being rolled or buttoned up, so as to expose the skin of the forearm. It is all the more important to do this, that is to make all the use possible of what evaporating areas are accessible, because, by the nature of things, a great many which are open to the civilian are closed to the soldier. Even if the latter could take off his coat there is still the fact that he must carry at least a greatcoat, if not a pack, and where these touch the skin, perspiration at once accumulates because evaporation is impeded.

There is on record a concrete historical instance of the effect of difference in clothing on the endurance of troops. It occurred at the attack on Chin-Kiang-Foo in the first Chinese War. The 98th Regiment, healthy and strong, having just newly landed, ascended the heights dressed according to regulation. The heat was intense, and numbers of men fell dead on the way from heat-stroke. The 18th, 49th, and 55th Regiments, equally exposed to the sun, but with their jackets opened and their stocks removed, did not lose a single man from this cause. Of course, the removal of the stocks must have had some effect, but the main difference was undoubtedly that while the men of the 98th could not get rid of the heat produced by the march, since the perspiration could not evaporate sufficiently rapidly through their tunics, the men of the other regiments having their jackets open, were able to take advantage of this method of reducing their temperature.

As to the effect of marching in a dense formation on the temperature of the men in the centre of the column, there are as far as I know no accurate observations. If you notice a flock of sheep being driven along the road, you will see at once the dense cloud of steam that arises from them, and, of course, one knows how a horse steams after a gallop on a cold day. This steam is merely the evaporating perspiration condensed and made visible by contact with the cold air. Now, it is easy to understand that towards the rear of a column the air must, especially if it is a still day, become so saturated with the moisture that has evaporated from the men in front that it will be unable to take up any more moisture from the men further back, who will therefore suffer from an accumulation of heat in their bodies. Obviously this is more likely to occur on a day when the air already contains a great deal of moisture, than on a day which, though hotter, is drier. Now, these factors which impede the dissipation of heat of which I have spoken, so far, are all, to a certain extent, controllable by the commanding officer. There is one factor which cannot be controlled, and that is the weather.

The effect produced by the weather conditions on the temperature of the soldier is due not so much to the heat of the air *per se* as to the amount of moisture it contains at that temperature. How marked the effect of the two combined can be, will

be seen from the diagram Plate I. (b), showing the effect of weather conditions. The march is the same as that already mentioned, a distance of 7 miles across the Long Valley and back. This was performed by the same man in drill order on the 30th August, 1906, and on the 11th March, 1907. The temperature by the wet bulb thermometer was 22° F. higher on the first occasion than on the second, and the air much damper. The man's temperature rose barely half a degree on the second occasion, and over one degree on the first. That is to say, that the difference in the temperature and moisture above stated had an effect on the accumulation of heat in the body more than equivalent to that produced in the act of carrying 30 lbs. the same distance.

There are other physical effects produced by the act of marching, but before I come to them I wish to emphasise the point, that what chiefly makes the difference between the soldier marching, and the civilian walking, is the fact that the latter can please himself in the measures he takes to dissipate the heat produced by walking, while the former cannot. What he cannot do for himself his officer must do for him in every possible way, and not merely for the man's comfort, but because every unnecessary decimal point of temperature, that is allowed to accumulate in the man's body, not only throws an unnecessary strain on his heart and lungs, but brings him by so much the nearer to heat stroke.

The other physical effects of marching are its effect on the heart, the lungs, and the weight of the body. But these effects are not primary effects, they are all secondary to the fact that marching is a muscular exercise, and as a consequence, that it causes an increased production of heat in the body. To begin with the heart. The heart has to supply blood to the muscles in increased quantity, partly to supply increased fuel to the engine, but also, what is far more important at the moment, to supply increased oxygen to support the combustion that is the concomitant of the muscular action. This increased quantity of blood demands an increased activity of the heart, and, consequently, we find as one of the early results of marching a quickened heart beat. This increases in rapidity fairly regularly with the rise of temperature, and remains fairly constant once it has attained the rapidity demanded by the call of the muscles for oxygen. There are other factors probably that affect the rate of the heart, but for our present purpose we can consider the above as generally true.

The diagram, Plate II. (b), shows the effect of change of air temperature. The heart beat was quickened from 70 beats to 120 on the 30th August, 1907, as compared with an acceleration of from 70 to 95 on the 14th March, 1907, though the man's temperature was practically the same in both cases. This is explained by the fact that he perspired exactly twice as much on the first occasion as he did on the second, his temperature

being thus kept down. His temperature *production* in the two cases probably bore a very close relation to his heart beat. The chief point in which the marching soldier differs from the walking civilian in this connection is the presence of constricting bands in the former which the latter is free from. On service this is not so much the case, as dress then soon accommodates itself to the exigencies of the situation, but on manœuvres in peace time, unless the soldier is allowed to loosen his collar there may be some constriction on the big blood vessels of the neck. Otherwise there does not, with our present equipment, seem much danger of interfering with the action of the heart directly.

This has not always been the case. There is a record in the life of a rather well-known soldier of fortune, Donald Monro, of "a Danish Captain who was accustomed to make the men of his company tie their cravattes very tightly, and use garters very tightly pulled below the knee, so that from the high colour of the face and the size of the calf they might appear more vigorous and better fed; but at the end of a certain time they almost all fell ill." In the case of the attack on Ching-Kiang-Foo, already alluded to, the pressure of the stocks on the blood vessels of the neck, played some, though not the chief, part in the disastrous result.

We now come to the effect of marching on the respiration. The increased combustion in the muscles demands increased oxygen and, therefore, an increased supply of air to the lungs. The civilian walking can get this in two ways: either by increasing the number of his respirations or increasing the depth of each respiration. He probably makes use of both methods, but the latter more than the former. Here, of course, is where the soldier is handicapped. He has in breathing to move either the walls of his abdomen or those of his chest, or both. But a movement of either is affected by the weight he has to carry. He cannot, therefore, make free use of the method of deepening his inspirations, and must rely more than the civilian on increasing their number; but every inspiration he takes means a certain amount of work expended in lifting or moving certain weights which come into close relation to the walls of his chest or abdomen. This is inevitable, to a certain extent. What is not inevitable is that the weights should be so disposed on his trunk, and supported by straps so placed as to exercise the maximum of restriction to the movements of the chest and abdomen. In the old bandolier equipment every expansion of the chest had to work against three straps, viz.: the bandolier, containing fifty cartridges, and weighing 4 lbs. 9 ozs.; the haversack strap, supporting a weight of 2 lbs. 14 ozs.; and the water bottle strap, supporting a weight of 3 lbs. 12 ozs. Now, that cannot be called giving the chest fair play. I have already told you that no strap should cross the body above the belt, so as to allow of the coat being thrown freely open to

encourage evaporation. There is an equally strong argument in its favour on the score of facilitating respiration and the movements of the chest.

I am aware that the question of how to carry the load is extremely difficult, especially when so large a part of it must consist of ammunition which must be so placed as to be accessible. I said that there was not much danger of our present equipment interfering with the action of the heart directly, but indirectly there is a very considerable danger, and for this reason:—Any impediment to the respiration means that the blood that is going to the lungs to get purified, on its way from one side of the heart to the other, becomes checked, and tends to head up towards the right side of the heart. At the same time the blood comes in to that side, from the body generally, unchecked, and the right side of the heart and even the liver become overloaded and distended.

The third effect of marching is loss of the body weight. This is due to more than one cause, but, undoubtedly, the preponderating cause is loss of moisture by perspiration. This loss of moisture is, of course, directly proportional to the heat produced. In itself it is a healthy reaction. But it is considerably greater than one would at first suppose. Thus you will see from the diagrams (Plate III.) that Private Beach, of the Yorkshire Regiment, lost on the 20th August, 1906, as much as 4 lbs. of weight in a march of seven miles across the Long Valley. The greatest weight lost by any one of the five men who made that march was higher than this, about 5½ lbs. This represents about half-a-gallon of water taken out of the system. The relationship of this loss to the efficiency of the soldier is of the very greatest importance. The body of a man who weighs ten stone contains rather over 88 lbs. of water. Of this he can afford to lose a certain amount only, and no very great amount. Any loss amounting to one-tenth of the total, that is, less than 9 lbs., unless replaced at once, means death, and long before that point is reached, naturally, exhaustion will have set in. Now, in the above case one of the men lost more than half the total permissible loss, and it is probable that a very little more would have resulted in his breaking down. The noticeable part of this is that these were not untrained men, but privates towards the end of the drill season. The importance of this loss of weight is that the great and debatable question of drinking on the march must be settled in definite relation to the amount of water lost, because this loss of water means a heightening of the specific gravity of the blood, a thickening of it, so to speak, and this thickening, if allowed to go too far, will eventually diminish the power of perspiration, and, therefore, the power of cooling the body, with results that can best be stated as heat stroke. Now, of course, there are two kinds of thirst: the thirst of habit, and the thirst of necessity. The former thirst is a habit that anyone can be

trained out of, and one which every soldier should systematically be trained out of. It is very different with the thirst of necessity, which is the cry of the thickened blood for water. This is the thirst you cannot train men out of, or at least, only to a small extent and with exceptional men. And besides, though you may train a man to disregard the sensation of thirst in his mouth, which is the outward expression of the actual deficiency of water in his blood, you cannot get round the fact that as long as he is working his muscles he is producing heat, and that if that heat cannot find its natural outlet, it will accumulate in his body, and the end of that is heat stroke. If you want to press your men they must have water, or else they will not get through the march, or if they do, will be fit for very little at the end of it. I am as great an advocate as anyone can be for water discipline, that is, for training the men to abolish the thirst of habit. But there I stop. The great advantage of doing away with the thirst of habit is, that you can then tell when the real thirst begins, the physiological thirst that must be gratified if the human machine is to keep running. I will give an actual instance, illustrating the necessity of attending to this point. If you will go to London Bridge on a hot day in the summer, you will find buckets of oatmeal water set there for the omnibus horses. These were placed there originally because the General Omnibus Company found that the death rate and sick rate of their horses from heat stroke was so high, without this watering, that they had to make these special arrangements. Of course, their motives were purely commercial, and it has been found to pay. Therefore, in arranging for a forced march, it is wise to take particularly good care to see that there is as much water as can be got for the men.

There are two other points in connection with this subject of the march, pure and simple, and those are the question of halts and the effect of training. On neither of these is it necessary to say much. Halts have the effect of allowing the men's temperature to come back to normal, their pulse rate to lower, and the respirations to fall in number. The effect is fairly quickly felt. Thus, taking the pulse rate in an actual case. A man doing in fifteen minutes an amount of work equivalent to 32 foot-tons, that is equivalent to the work that a 12 stone man would do carrying 100 lbs. one mile, raised his pulse to 132 beats per minute from 61; after two minutes' rest it fell to 100; after five to 82; after ten to 77; and after fifteen to 70. From what I have already said it follows that the frequency of halts should be regulated a great deal by the temperature, but even more by the moisture of the day. Marching small bodies of troops, a brigade, say, it seems to me to be a mistake to order a halt every hour, or at any stated period. The proper test for the time when to halt is the condition of the men at the rear of the column. One halt every hour for five minutes is a good general rule, but it is a mistake to

be too rigid. The best criterion is the condition of the men at the rear of the column. A wise man takes his weight off his horse's back when he halts, and a wise man will take the loads off his men's backs too, even at a short halt. With the present equipment this is easy, which is one of its greatest advantages. Field equipment should be so designed that it may be taken off and put on by the man himself in one motion. The great importance of getting the equipment off is that it not only takes the weight off the man, but that it also allows the moisture to evaporate from parts that have been covered by the greatcoat or sack. There is an old saying of General Stonewall Jackson's that a man rests all over when he lies down, and there is a great deal of truth in it.¹ As it is well known that the pulse and respiration are slower when lying than when sitting, there seems a sound physiological basis for doing so. As to training, the effect of this in reducing the rise of temperature, etc., is very striking. It is not merely a case of physical condition, since the four men of the Yorkshire Regiment, that were the subjects of the experiment, were in good enough physical condition at the start. These men marched the set march at the beginning of the series, carrying a load of 2 lbs. only, and the same after three weeks' regular marching carrying 7 pounds. The temperature of the air was practically the same on both days. On the first occasion the average increase in the pulse beat was 43 in the minute, in the temperature 2.1 degrees, and the loss of weight was 3½ lbs. On the second occasion the increase in pulse beat was 22 beats, in temperature 1.2 degrees, and the loss of weight only 2½ lbs. The difference when the man starts untrained is even more striking. Thus, in the case of Dr. Pembrey, the rise in pulse at the beginning was 72 to the minute, in temperature 2.2 degrees, and the loss of weight 2½ lbs. At the end of the period his pulse increased 28 beats only, his temperature .6 of a degree, and the loss of weight was under two pounds. It is hardly necessary to tell you that training improves a man's capacity for marching, but one would hardly anticipate that taking men in good condition the mere practice of route marching repeated steadily several days a week for three weeks would have made so marked a difference.

An ordinary march may be taken at 15 miles, requiring an expenditure of energy equivalent to 1,350 energy units; on the

¹ The following quotation is of interest in this connection. It is extracted from "Twelve Years of Military Adventure," by Lieutenant Blakiston, who served in the later battles of the Peninsular War, in a Portuguese Battalion in the Light Division. "Our system of marching was calculated as much as possible to lessen the fatigue of the troops. During a march of about 12 miles or so we always made two halts, when the soldiers immediately took off their packs and lay down, each company resuming them only just in time to admit of its marching off in time." Vol. II., pp. 176-7.

supposition that the man weighs 10 stone, and carries the ordinary heavy marching order of the Infantry private. This expenditure of energy is about three times as great as the actual effective work produced, since the human engine possesses a very high factor of efficiency, greater than that of any steam engine. This rule is true, however, only for comparatively moderate distances. As soon as fatigue begins to be felt the engine begins to work uneconomically, that is the amount of energy expended bears a higher ratio than before to the effective output of work. Already by the end of 15 miles some effect is felt in this direction, the expenditure of energy having in some cases been observed to rise by one-fifth. Each successive mile has a greater effect than the last. We see a closely analogous instance in the case of steam engines. Every horsepower over a certain amount demands an excessive expenditure of fuel, and the difference between 20 and 22 horse-power in this respect is enormously greater than that between 10 and 12. The human engine is similarly affected by pace, as already stated, but it is also affected by duration of activity, because, unlike all other engines, the body has to be self-stoking, self-repairing, and self-cleansing. These two last functions cannot be carried out satisfactorily while the engine is at work, and, therefore, the need for bodily rest. Now if you lengthen the march you shorten the period of rest, while at the same time you disproportionately increase the amount of unproductive expenditure of energy as I have already stated.

Repeat this day after day, and you can at once imagine the engine getting clogged by the waste products it cannot get rid of, and also weakened by the lack of repair of worn out parts. You can, at the same time, understand how forced marching breaks up even the best disciplined force, not because the men won't march, but because, after a certain time, they can't march. Of course, forced marches have to be made, and if they cause the breakdown of a third of the force that does not make them any the less necessary. But their effects can be minimised. In the first place the load can be decreased. It is, of course, the question of whether it is better to go light and want your comforts, or to have your comforts and be too tired to appreciate them. Much must depend on the climate, but a young, healthy soldier ought to be able to stand a good deal of exposure, while flesh and blood, not being metal, his muscles cannot do more than a certain amount of work. The second resource is to feed the men. The energy necessary for every foot pound of work you do is supplied by a certain amount of food, or else by a certain amount of destruction of tissue. If the work is very severe, the latter always occurs, and it has been proved by direct experiment on athletes that the harder trained a man is, the better he can stand this waste. This waste can be checked by a liberal supply of food,

which is, unfortunately, just the thing that is so hard to manage on a forced march of any duration even by the use of emergency rations.

Last, and to my mind the most important of all, is the question of water. As I told you before, if a man loses more than a certain amount of water from his blood in the way of perspiration, he will stop perspiring and his temperature will mount up. Not only this, but the thickened blood will be unable to remove the waste products of the process of combustion that has been going on in the muscles; this can only be carried on unsatisfactorily at the best, while work is going on, and I am, therefore, not speaking so much now of the water supply on the road. It is the water supply on arrival at camp that counts in this case, and if you ask me, I should say the more the better. Of course, the question will always come in: Is it better to give the men their fill of doubtful water, or stint them to a limited supply of good? That depends entirely upon circumstances. If the march is the chief object, that is, if it is necessary to get to a certain point in a certain time, you must chance the purity of the water. Without water the men will not get there at all. Of course, the result may be an outbreak of enteric fever or dysentery at a later period, but if you have attained your objective in the meantime, that must be risked.

On the question of the pace of a forced march, it is, I think, of interest to note that in an order issued by General Stonewall Jackson in April, 1863, not long before his death, and, therefore, with all the experience of marching that he had had in the Shenandoah Valley behind him, he lays it down at one mile in 25 minutes, with a ten minutes' halt every hour. This we should count as slow, as it only means two miles an hour, and, of course, that entails the men being much longer on their feet than a quicker pace would.

The whole subject of marching, both ordinary and forced, is one which still demands careful experimental observation.

PLATE I.

EFFECTS ON BODY TEMPERATURE OF LOAD CARRIED.

TEMPERATURE OF AIR (WET BULB) AND CLOTHING.

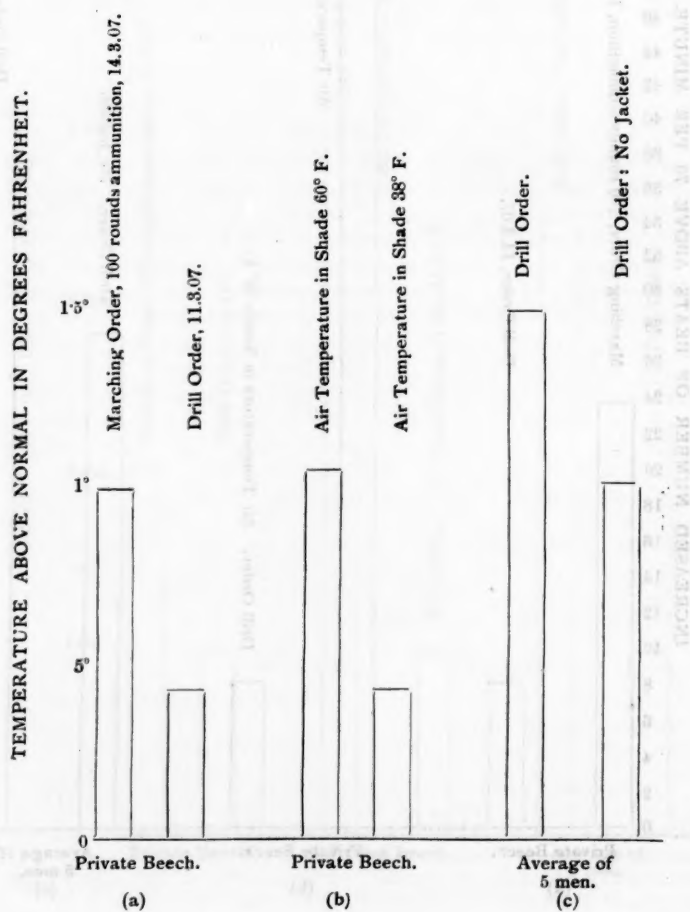


PLATE II.

EFFECT ON PULSE RATE OF LOAD CARRIED.
TEMPERATURE OF AIR AND CLOTHING.

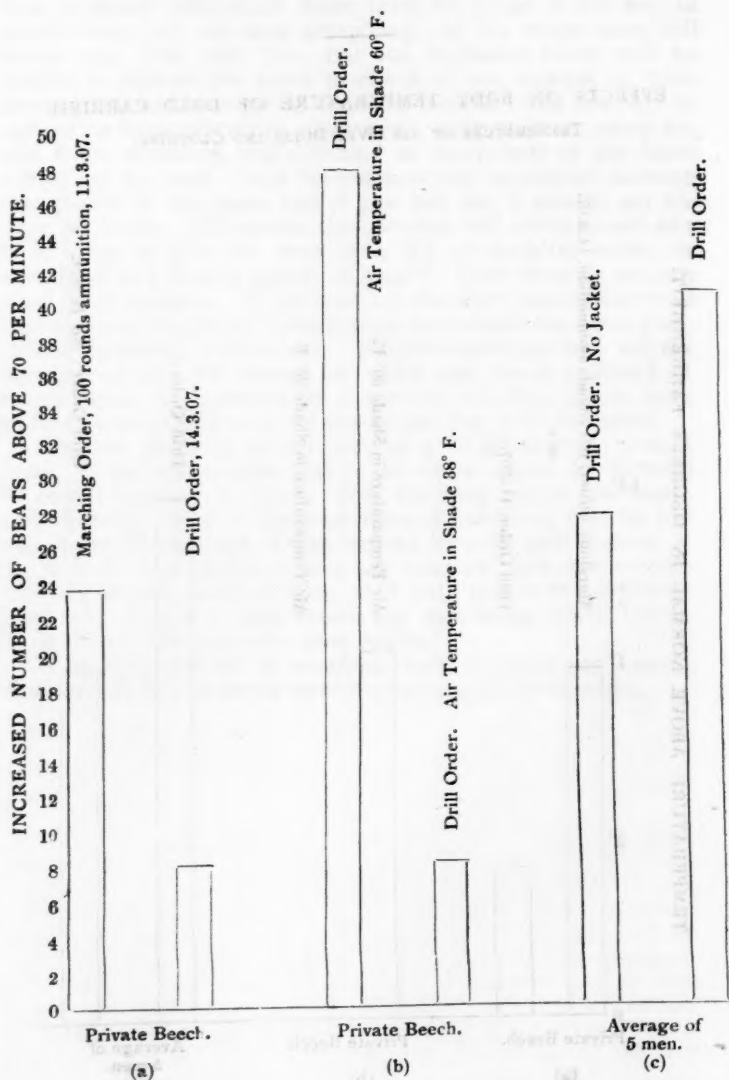
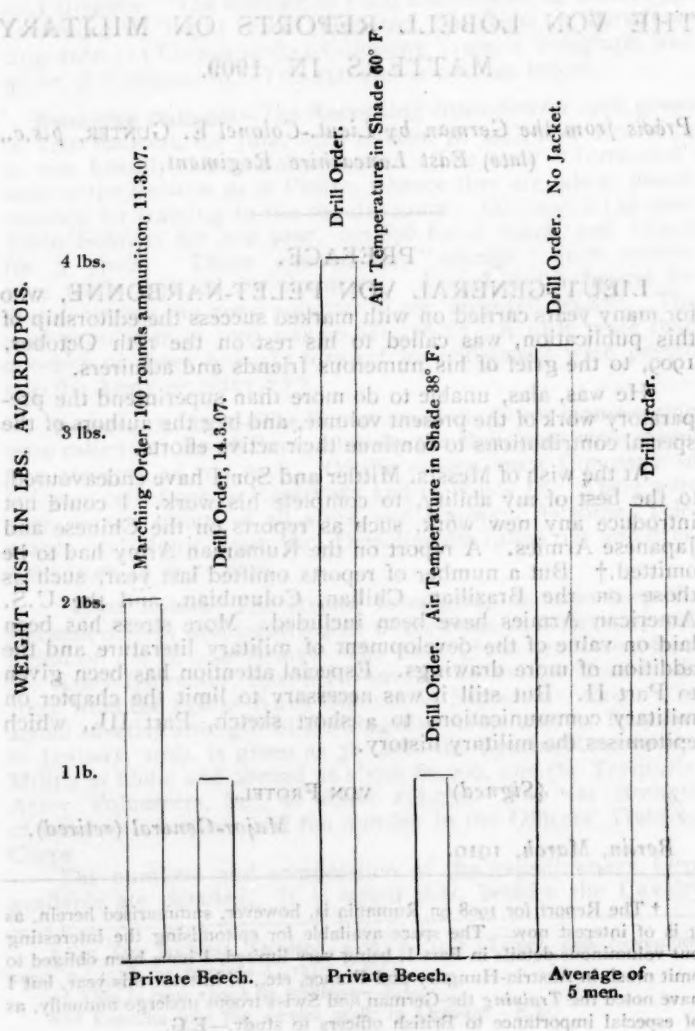


PLATE III.

EFFECT ON LOSS OF WEIGHT, OF LOAD CARRIED.

TEMPERATURE OF AIR AND CLOTHING.



THE VON LÖBELL REPORTS ON MILITARY MATTERS IN 1909.

*Précis from the German by Lieut.-Colonel E. GUNTER, p.s.c.,
(late) East Lancashire Regiment.*

PREFACE.

LIEUT.-GENERAL VON PELET-NARBONNE, who for many years carried on with marked success the editorship of this publication, was called to his rest on the 11th October, 1909, to the grief of his numerous friends and admirers.

He was, alas, unable to do more than superintend the preparatory work of the present volume, and beg the authors of the special contributions to continue their active efforts.

At the wish of Messrs. Mittler and Son I have endeavoured, to the best of my ability, to complete his work. I could not introduce any new work, such as reports on the Chinese and Japanese Armies. A report on the Rumanian Army had to be omitted.† But a number of reports omitted last year, such as those on the Brazilian, Chilian, Columbian, and the U.S. American Armies have been included. More stress has been laid on value of the development of military literature and the addition of more drawings. Especial attention has been given to Part II. But still it was necessary to limit the chapter on military communications to a short sketch, Part III., which epitomises the military history.

(Signed)

VON FROTEL,

Major-General (retired).

Berlin, March, 1910.

† The Report for 1908 on Rumania is, however, summarised herein, as it is of interest now. The space available for epitomising the interesting but voluminous details in Part I. being very limited, I have been obliged to omit much in Austria-Hungary and France, etc., of interest this year, but I have noted the *Training* the German and Swiss troops undergo annually, as of especial importance to British officers to study.—E.G.

PART I.

ORGANISATION.

Germany—The organisation and strength of the German Army is practically the same as it was in 1905,[†] except that the Infantry Battalions have been increased by 5 Battalions, the Cavalry by 2 Brigades[†] (4 Regiments), the Field Artillery by 1 Brigade. The number of Field Batteries is, as before, 532 (including 63 Light Field Howitzer Batteries), 3 Battalions Engineers (13 Companies), 1 Company Train, 1 Telegraph Battalion (5 Companies). The stations remain as before.

Recruiting Statistics.—The Recruiting Statistics for 1908, given in THE JOURNAL for July, 1910 (Notes, p. 947), are, according to von Löbell, substantially correct. The word "Territorial" used in the *Bulletin de la Presse*, whence they are taken, means enrolled for training in the regular army. Of these 2,135 were Train Soldiers for one year, 191,876 for 2 years, and 13,498 for 3 years. Those entered as "exempt" from service were really rejected for character. Von Löbell's figures for those entering the army voluntarily are, however, 56,876. The total population in 1905 was 60,641,278.^{††} A little more than one-fifth of those brought forward for enlistment were passed into the Army or Navy.^{†††}

Training in 1909.—The Reservists of the Corps manœuvring were called out for 28 days, whereby the Battalions were raised to a strength of 700 each. Of the others, each Company of Infantry called out 10 Reservists and of Rifles 15. There were over 300,000 troops of all arms, and Railway, Airships, Telegraph, and Motor Train, &c. Detachments called out and exercised from 14 to 21 days.

Great Britain.—The Report takes great pains to keep the German officers well informed as to the exact numbers and condition of the British Army. The facts given are taken from the Army Estimates, 1909-10, from the Territorial Year Book, 1909, from the List of Army Stations in September, 1909. The actual effective strength of the Regular Army and its Reserves in January, 1909, is given as 387,000, the Special Reserve and Militia at home and abroad as about 80,000, and the Territorial Army Volunteers, &c., as about 212,770. The war strength of every unit is given and the number in the Officers' Training Corps.

The numbers and composition of the expeditionary force available are detailed. It is stated that, besides the Cavalry

[†] See THE JOURNAL, October, 1905, p. 1258 (Table), and November, 1909, p. 1518, as regards Cavalry.—E.G.

^{††} This is now about 65 millions.—E.G.

^{†††} Recruits join the service early in October.—E.G.

Division and 6 Infantry Divisions, with Army Troops and Line of Communication Troops, a seventh Division can be formed from the Garrisons in the Cape of Good Hope, Egypt, and Malta. It was also, it is said, intended to form another Division from British and Colonial Troops in case of war. It notices the formation of the Territorial Reserve, by which, it says, it is hoped to take the wind out of the sails of the National Service League, the efforts of which, under Lord Roberts' leadership, is to introduce universal compulsory service for Home Defence. It gives the outlines of the National Service League Scheme, saying that the additional expense was reckoned by them at 8½ millions,† as against the War Minister's estimate of 13 millions per annum.

ITALY, 1909.

The officer who reports on the Italian Army complains that no official information is now obtainable regarding even the Peace Strength and organisation of the Italian Army. It is only from the half-yearly Reports of the Stations of the army in the service newspapers that a rough Table of the Army Corps, &c., with their distribution, can be given; but as some Units are often serving in other Districts than where they properly belong it cannot be in any way considered exact. Certain details are given, taken from *Streffleur's Zeitschrift*, 1905, as regards the strength and distribution into 1st, 2nd, and 3rd Line of the three arms and of the Technical Troops, but these are evidently not looked on as reliable.

New Formations.—On the 1st July the long-planned reorganisation of the 4 senior Cyclist Companies of the Bersaglieri Regiments in one independent Cyclist Battalion, forming part at present of the Bologna Garrison was carried into effect. It consists of a Headquarters, Staff, and 3 Companies. The Commandant and certain officers are provided with Motor Cycles. The rest have the Melli-Rossi folding cycle. It is in contemplation to form two other Cyclist Battalions.

PORTUGAL.

The war strength of Portugal consists of about 2,500 officers and 105,000 men. About 500 additional officers and 1,200 men in reserve are also available. There are also about 140,000 to 150,000 Territorials liable to be called out on mobilisation. The organisation is in 6 Infantry Divisions, 5 Cavalry Brigades, 6 Field Artillery Regiments, and 10 Field, &c., Companies of Engineers. Two Infantry Divisions, each of 2 Brigades of 4 Regiments, each of 3 Battalions, are in Lisbon, Eoona, Oporto, Villa Real, Corinbra, and Vizeu (about 45 miles north-

† This is an error, the League reckoned the cost at about 4½ millions.—E.G.

east of Corinbra on a railway). The Battalions have only three Companies each on a peace strength, as now. There are also 5 Battalions of Rifles, each of 6 Companies, in Portugal, in Lisbon; and 1 Battalion of 6 Companies in Oporto. These Rifle Battalions have each a Machine Gun Detachment and a strong Cyclist Section. The Cavalry Brigades have 2 Regiments, each of 5 Squadrons. Of these Lisbon, Oporto, and Vizeu have 1 Brigade each. There are 2 other Brigades distributed in country quarters, doubtless in small bodies.

There are 3 Regiments of Field Artillery in Lisbon, 2 in Oporto, and 1 in Vizeu. There are 2 Brigade Divisions of 3 Battalions each in each Field Artillery Regiment. There are 18 Fortress Artillery Companies. There are about 2 Engineer Companies in each of the above-named garrisons. On mobilisation for war each Infantry Battalion expands from its peace strength of 14 officers 600 men to 21 officers 1,000 men. The Rifle Battalions, however, have a peace strength of 25 officers to 530 men. There is an entrenched camp near Lisbon, where a Governor, with the rank of general, is in command. Two-thirds of the officers are promoted from the ranks, and one-third appointed from the Military College in Lisbon. Promotion is by seniority, but promotion examinations must be passed before attaining a higher rank. Divisional generals retire at 70, brigadiers at 66, and colonels at 64; the remaining ranks at 60. Half-pay retirement is allowed after 15 years' service, and full pension after 35. The Infantry are armed with the Vignero-Mausier rifle, and carry portable intrenching tools, and the officers carry the Parabellum automatic pistol. The field gun is a 7.5 cm. (2.95-inch) quick-firing field gun on the Canet system. The Heavy Artillery have 15 cm. (5.9-inch) Schneider howitzers. The discipline and training of the Army is said to be good.

Rumania.—No Report on the Rumanian Army is given this year, but as this Army was reorganised in 1908 a few particulars are given for which there was no space in the last *précis*.

The Army is organised in 4 Army Corps, Headquarters as follows:—I., Krajova; II., Bucharest; III., Galatz; IV., Jassy. The II. at Bucharest has 3 Divisions, the other Corps 2 Divisions, each having 2 Brigades as a rule (at present the 9th Division has only one). There are 35 Regiments having 3 Battalions each on permanent service. There are 7 Brigades of Cavalry having 3 or 4 Regiments of Rosiori (permanent) in each. The other regiments are Calarasi, whose service varies. Of these there are 9. One of these Rosiori is attached to each of the Army Corps. They have 6 Squadrons and a Remount Detachment each, and are apportioned as Divisional Cavalry. The other 6 Regiments can be united in war into a Cavalry Division. They have 4 Squadrons each and a Remount Detachment, as have all other Cavalry Regiments. Every Cavalry Regiment has

a Machine-Gun Detachment. There is an Artillery Brigade, of 3 Regiments of 2 Divisions each, attached to each Army Corps (that in Bucharest has 4). Total: 75 Field Batteries, 5 Howitzer Batteries, and 9 Batteries of Horse Artillery in Galatz. The Artillery and Engineers are very good, the Staff good. The service in the Active Army is 2 years, in the Reserve 5 years, and in the Militia (Miliz) 3 years. Then the service in the Landsturm (Territorials) is for 4 more years. These periods were fixed by the reorganisation of 1908, the objects of which are: (1) to facilitate mobilisation, (2) to increase the quality of the Infantry, (3) to increase the number of trained men passed annually into the Reserve, and at the same time increase the peace establishments, (4) to better apportion the different arms of the service. The total liability to service now extends from the 21st to the 40th year of age (inclusive).

SWITZERLAND, 1909.

No change in the organisation or strength of the Federal Forces is reported since 1907, but to the short *précis* of the report on the Swiss Army, 1907, given in the JOURNAL for December, 1908, pp. 1695-96, the following items may be added: Troops not included in Divisions or Army Corps: Elite†—1 Railway Battalion (4 Companies), 1 Balloon Company, 2 Ammunition-Parks of 3 Ammunition Columns, 2 Supply-Park Columns, 3½ Columns of Garrison Artillery (18 Companies, of which 11 are Landwehr Artillery), 24 Squadrons of Dragoons (Landwehr Cavalry), 12 Companies Mounted Guides, 11 Companies Sappers (Landwehr), 4 Bridging Companies, 2 Telegraph Companies, 4 Railway Companies, 14 Field Ambulances, 5 Ambulance Columns, 3 Hospital Trains, 8 Supply Companies, 9 Companies Train, and 8 Transport Companies. All these are Landwehr.††

There are also organised 96 Fusilier Battalions of the Landsturm†††, and a number of Companies of Sharpshooters. The remainder are not yet organised.

The Auxiliary Services, consisting of men belonging neither to the Elite, Landwehr†, or Landsturm,†† are classed as Engineers, Cyclists (finding their own cycles), Guides, Carriers, Electrical Workmen, Telegraph or Signal Men, Workshop Men, Sanitary Assistants, Bakers, Butchers and Cooks, Magazine Men, Transport, Porters. These are formed in peace into sections and divisions under leaders as required. They wear their ordinary dress, but with the Federal arm band and a ribbon round their hats or caps with the Cantonal cockade.

† The Elite are liable for service from the age of 20 to 33.

†† The Landwehr are liable for service from the age of 33 to 41.

††† The Landsturm are liable for service from the age of 41 to 48.

PREPARATORY TRAINING.*

An important order of the 2nd November, 1909, regulates the preparation of boys and youths for military service.

Gymnastic training is made *obligatory* from the beginning to the end of school life, whether in public or private schools. It is divided into stages according to age. 1st stage, from the time of entering school to the 10th year of age; the 2nd from the 10th to the 13th year; the 3rd from the 13th to the time the lad leaves school. In the first stage organised games and suitable free gymnastics are practised. In the second and third stages the course of gymnastics preparatory to military training is followed. It is carried on throughout the year. Every gymnastic class must practise at least two hours in every week.

The teachers are trained in the art of instruction in cantonal or in private training Colleges. Every teacher is obliged to be able to instruct in Gymnastics before he can get his certificate. The Federal "*Bund*" arranges each year the courses for instructors in the different districts. Continuation courses arranged in the cantons for the further instruction of certificated teachers receive grants-in-aid from the Federal authorities.

On leaving school the preparatory training of youths can be carried out as follows: (a) in voluntary courses of gymnastics without arms, (b) in voluntary preparatory courses with arms, (c) in voluntary target practices for young riflemen. The preparatory gymnastic training is free of all expense to the youth. The course of training may be carried out by any organised bodies of cantonal gymnastic societies or private associations. The minimum number of *hours* of attendance certified must be 50 in the year, the maximum 80. A march of from 20 kilom. (12½ miles) to 30 kilom. (18½ miles) must also be carried out. The whole course embraces marching, running, jumping without and with packs, weight-lifting, the surmounting of natural and artificial obstacles, climbing, national games and exercises. §

The Swiss recruit is trained in the "School of the Recruit" for the following periods: Infantry and Engineers, 65 days; Artillery, 75; Cavalry, 90 days. The instructors are professional officers. The n.c.o.'s school lasts for Infantry, 20 days; Engineers, Artillery, and Cavalry, 35 days in addition. The Officers' School: Infantry, Fortress Artillery, and Cavalry, 80 days; Field Artillery and Engineers, 105 days. The Central School of Tactics course for senior lieutenants lasts 30 days; for captains,

* I have translated this at some length, because just now it may be of service to the Army Council and to the Education Authorities. The organisation by Corps, Divisions, Battalions, etc., is given fully in the Report.—E.G.

§ Recruiting details and strengths of the Swiss Army for 1909 were given in THE JOURNAL for August, 1910, p. 1092.—E.G.

50 days. Several other tactical and technical courses are also held. Staff rides are held every two years as well as Manœuvres and Field Operations. General Staff Officers attend courses of 70, 42, and 21 days. The Elite have to go through an annual training of from 11 to 14 days ("repetition courses") in the Regiment, Brigade, Division, or Army Corps. The privates and corporals must attend a minimum of 7 days, the other n.c.o.'s 10 days, the officers all repetition courses. The Federal authorities give grants-in-aid to all Rifle Clubs which practice rifle shooting in accordance with the military regulations. All men of the Elite and Landwehr have to execute the prescribed course of firing under the same conditions. Any absentees have to make up the course *without pay*. Officers on appointment receive grants-in-aid of uniform up to 470 francs (about £18 15s.), and also on promotion. Weapons, equipment, knapsacks, field trunks, pocket lanterns, and field glasses are supplied them. It was decided last year to introduce travelling Field Kitchens for the Troops.

(To be continued.)

RASPLATA:

("THE RECKONING.")

By *Commander VLADIMIR SEMENOFF, Imperial
Russian Navy.*

Translated, by permission of the Author, by L. A. B.

(Continued from November JOURNAL, p. 1489.)

CHAPTER X.

THE EFFECT PRODUCED BY THE ARRIVAL OF THE "AUTO-SINKERS"—HURRIED PREPARATIONS FOR THE LAST STAGE—TWO WORDS ON THE STATE OF HEALTH—SINK, BUT PUT THE ADMIRAL INTO ANOTHER SHIP—SOMETHING FROM THE CONVERSATION OF LIEUTENANT S.—CONSIDERATION ABOUT A FLYING BASE—WITH WHOM WAS GOD? "WITH US" OR "WITH THEM"?—THE CHOICE OF ROUTE TO VLADIVOSTOK—NAVIGATIONAL CONSIDERATION—TACTICAL CONSIDERATION: SUDDEN APPEARANCE, KEEPING TOGETHER ALL FORCES FOR THE DECISIVE MOMENT, THE MORAL ELEMENT, THE QUESTION OF FLEET AUXILIARIES.

THE junction with the division of Nebogatoff's "auto-sinkers" (as they were called by the men who were not serving in them) did not give rise to any fresh enthusiasm, gave no new impulse towards a victory of the mind over physical weariness. In my diary this meeting is described in great detail. It was solemn. We were moved almost to tears. Everyone was rejoicing, jubilating. But what was the cause of it? "We are stronger now, we can now hope to destroy the enemy." Was it that? No, not that! Thus thought, perhaps, those heroes who sat in comfortable armchairs at St. Petersburg, and whose sea cruises were limited to the stretch between that place and Cronstadt.

It was not this, that the squadron concerned itself with. No; at 3 p.m. on 9th May, when Nebogatoff's division joined up with us, every one rejoiced and congratulated his neighbour, but... not over this addition to our strength, these increased chances of smashing the enemy, but because of the prospects of a speedy termination of that enervating period of waiting.

"At last!"

If in place of Nebogatoff's ships the Japanese Fleet had hove in sight we might perhaps have received it with no less, if with no greater joy.

That was the mood we were in.

The Admiral issued a General Order, drawn up by himself, which was intended duly to appreciate the happy event, and to raise our spirits. But how artificial, how insincere this order (No. 229 of 9th May) read; how little did it resemble those fiery words flung out at Vigo, when a collision with the 28 English battleships seemed imminent, or that stirring speech which he made on Christmas Day off the coast of Madagascar!

During the four days which Nebogatoff spent in seclusion in Port Dayotte, whilst we cruised about at sea, he not only had to replenish his ships with coal, provisions, &c., but he also had (and that was the chief thing) to make himself acquainted with the General Orders and circulars which had been issued in the squadron and which contained various directions for assuming battle formation, and making preparations for action, according to the bearing on which the enemy was sighted; and, further, the orders as to the employment of the armament, &c., &c. The whole of this literature was supplemented by the orders which had been previously worked out and had now been issued, in which was laid down the part the "Third Division of Battleships" (as Nebogatoff's division was now called) was to play. The *Monomak* was removed from his command to that of the cruiser division under Admiral Enquist. I need hardly mention that as a matter of course, on the same day, 9th May, complete sets of all these documents, which had been prepared beforehand, were handed not only to Admiral Nebogatoff and his staff, but to the captains, seconds in command, and the officers' messes of the newly-joined ships. It was out of the question to assemble these officers and to explain all this verbally to them, as there was no time. Above all, it was imperative to fill up these ships with coal, stores, and provisions, for Jonquières might arrive any moment and ask the division to leave, however sincere his regrets might be. Indeed, this actually happened. On the 14th May the *Guichen* was a witness of our final departure from these waters; she hove in sight (intentionally or accidentally) just at the moment when the whole armada was already outside and taking up its cruising formation. Our sincere friend was thus relieved from the disagreeable necessity of "having the honour to request." On the contrary, he was able (with all his heart, I believe) to send us by wireless his best wishes for a good passage and every success in the battle which was before us.

There could be no question of carrying out any tactical exercises or target practice in conjunction with the "Third Division of Battleships." As regarded the latter, there were "firstly no shell. . . ." As regarded the former, it was intended to carry them out *en route* if opportunity arose. It was too

late for lessons; we might have to go into action to-morrow, if not to-day.

A few words about the general state of health (a strange subject!). Thanks to the steps which had been taken to carry through both the best system of feeding and of living generally, and as to which the Admiral had given stringent orders, the general state of health in the fleet was satisfactory. Ten thousand men shut up in iron boxes, six months in the tropics—and no epidemic of any kind. Of one malady, however, I have spoken—exhaustion due to over-exertion. Of this there were pretty frequent cases. I have no statistics at hand, and can, therefore, only cite examples such as came under my personal observation on board the *Suvoroff*, as I do not trust my memory concerning information from other ships, for my diary does not contain any notes on the subject.

The Admiral, as I have already related, was taken ill in Madagascar. He spent two days in bed, then he got up again, not so much thanks to the doctor's treatment as to his own strength of will; all the same, he generally looked ill, and on the days immediately following upon periods of special excitement or exertion he dragged his bad leg very markedly. Outwardly he was literally reduced to skin and bones. The chief of the staff had a slight infusion of blood into the brain during the passage to Annam, resulting in partial paralysis, which, however, did not prevent him from doing his work. (I am afraid the doctors will accuse me of using inaccurate terms. I beg their pardon. I did not enter in my diary the Latin terms which those of the flagship gave me.) The "Master of the Fleet" (Colonel F——) latterly only partook of liquid, or soft, carefully chopped-up food. He was personally convinced, from his own observations, that he was suffering from cancer in the alimentary canal; the doctors assured him in the course of friendly talks that it was a case of aneurism, which produces the effect of a swelling and contracting of the alimentary canal.¹

The second flag-lieutenant, S—— (not to be confounded with the senior flag-lieutenant, also S——, my friend), whose constitution was generally feeble, was obliged, on the doctor's advice, to take refuge in opium and morphia. So far as I recollect, the staff torpedo officer, Lieutenant L——, was in a similar condition. Flag Lieutenant N——,² who was outwardly in robust health, also went to the doctor, and when asked, "What is the stuff you are always swallowing?" replied: "The local doctor prescribed me something containing bromide

¹ The same illness attacked the senior torpedo lieutenant, B——, a veteran of previous wars, who had been seriously wounded during the attack on the Taku forts.

² [Apparently a third.]

to calm my nerves and to counteract my sleeplessness." Of the ship's officers, a good third were patients, and they were all suffering from illnesses with such learned Latin names, that, since I did not at once enter them in my diary, I must decline trusting to my memory.

An astounding capacity for living—if I may use the expression—was exhibited by the captain of the *Suvoroff*, Captain J—. Firmly convinced that we were going to our certain destruction, he closed his eyes to the future, after he had once irrevocably decided this question, and lived entirely for the present, wholly absorbed in the care for his ship and her crew.

"How is it all to end? Whether we are going to capsize or not, or be killed by shell, torpedo, poisonous gases, wounds, by suffocation or drowning?—that all depends on God Almighty—and the 'superior authorities.' We shall certainly do our duty. No doubt the whole fire will be concentrated on the *Suvoroff*. It will be simply a hail of shot. But I have already given all necessary orders, and impressed upon the commander and the more senior lieutenants who would succeed to the command in turn after the captain had fallen, that they are always to bear this in mind: If the *Suvoroff* is nearing her end, let her go down, but before that transfer the Admiral to an undamaged ship. Without 'him' it will be all up. I am only afraid of one thing—he will expose himself to the fire, and they will kill him with the first shot. Then all will be lost."

Thus spoke the man whom, notwithstanding the many accusations which have been brought against him as regards his carelessness, even frivolity, I cannot help looking upon as the type of the ideal fighting sailor.

A very serious loss for the fleet was the death of Admiral Fölkersam, a cultured, experienced, and active seaman, and—what was still more important—a friend, loyal comrade, and co-operator of Admiral Rojestvensky, whose views he fully shared.

He was still alive at the time of our junction with Nebogatoft, but his condition was already hopeless and his days were numbered.

He was not called upon to suffer any longer. Fate was kinder to him than to his elder colleague. He did not witness the collapse of the squadron, and his coffin, placed under the ship's Holy Image [on the upper deck amidships], now rests on the bottom of the Sea of Japan, together with the battleship *Ossliabia*, perhaps still flying his flag, which has been kept up after his death, to avoid depressing the spirits in the fleet by striking it.

During our "wanderings" (which, by the way, cost us 20,000 tons of coal, not to mention the expenditure of lubricating and other material) in the long hours of enforced idleness, which was so relaxing, Lieutenant S— and I mostly foregathered. In the situation in which we found ourselves we both recalled

with pleasure the half-forgotten time of our common experiences during the five years we sat on the same bench at the Naval College. In the course of these talks with him I learnt much which up to then had been unknown to me, since I was considered an "outsider" by the staff. Possibly I learnt even more than other "real" members of the staff, for amongst these S— undoubtedly counted as the one who was the most initiated. Naturally I am not even now able to make public much of this, since at the time of writing it might have some influence on the march of events; on the other hand, it seems to me absolutely necessary to place on record the truth as regards certain events, about which our "strategists," who give themselves the appearance of well-informed men, have already written so much nonsense. But this is only possible on the supposition that mere office secrets are disregarded so far as they refer exclusively to the past, and so far as their divulgence now does no harm.

I heard now that, according to the Admiral's original plan (at the time when the Second Squadron was being got together), the objective of its voyage was the freeing of the First Squadron from its blockade (in Port Arthur), and then co-operating with it. Moreover, it had been decided, since the Japanese had grossly violated the neutrality of Chifoo at the time of the *Reshitelny* affair,¹ and had already, previously to that, acted in a similar objectionable manner at Chemulpo, not to pay any attention to the neutrality of these ports, and to enter into communication with Port Arthur, whilst using Chifoo as a base. The distance between these two ports is 70 miles, and therefore the fleet auxiliaries of all kinds would have been protected in the latter place by the fleet, which would be operating in so restricted an area. For the command of the sea, the Japanese, with four battleships and eight armoured cruisers at their disposal, would have had to fight the decisive battle with the First Squadron—six battleships and one armoured cruiser—and with the Second Squadron—seven battleships (*Nakimoff* and *Donskoi* were not counted in)—whilst the co-operation of the Vladivostok cruisers was perfectly feasible. The issue of the whole war would have depended on the result of this battle.

If the Japanese (which, however, was not very probable) had decided not to engage in such a game of *va-banque*, and had retired, even only temporarily, into their ports, then the siege of Port Arthur, also perhaps only temporarily, would have been raised, the place could have been supplied with all it required, and then our combined fleet would have acted in accordance with the progress of the land operations—that is, would either have assisted at the liberation of Port Arthur, in which besieged and besiegers would have exchanged parts, or would have left Port Arthur, once more fully supplied with

¹ [I.e., the capture of that destroyer.]

provisions and munition of war, to itself, and proceeded to Vladivostok. In this case it would have had to base itself on the latter place and to endeavour to bring about a decisive battle, which would give it the command of the sea and cut off the Japanese army from its home ports.

Under our institutions this plan, which was kept secret from the officers of the Second Squadron, could hardly remain unknown to the unfriendly foreign powers. Did not the new supplementary rules to the declaration of neutrality, the celebrated "Hull-affair" and all the noise which was made on its account, look like desperate efforts to prevent this plan from being executed? This question can be answered in the affirmative almost with certainty.

With the fall of Port Arthur (and even before), with the destruction of the First Squadron of the Pacific Fleet, this plan collapsed of itself. The Admiral worked out a second one, in his view the only practical one—viz., an immediate advance with picked ships, with Vladivostok as the objective, counting upon the temporary weakening of the Japanese Fleet, due to the exigencies of a prolonged war. Once there, since the available forces would be insufficient for a decisive blow, their object would be to open a guerilla war against the enemy's lines of communication. For this task our forces would suffice. This proposal was not approved of. It was decided to send out reinforcements to the Second Squadron, which were intended to make up for the failure of the co-operation of the First Squadron, and the "armada" retained its original task of (with the help of God) obtaining the command of the sea, that is, of beating the Japanese in a decisive battle. In vain the Admiral reported quite openly and in so many words that he looked upon the junction of these old, defective ships with his squadron as a "burden"; that with the forces at his disposal (even with the co-operation of the "burden") he had *no prospect* of obtaining the command of the sea. The St. Petersburg strategists found that, based on a careful calculation of the sum total which was made up of the "co-efficients of fighting value" of the several ships of the squadron, the latter already possessed "prospects of success," but that if a certain addition were made to this sum, the mere "prospect" would be turned into "certainty."

It is difficult to say whether the Japanese were informed of these negotiations. Perhaps they were. But perhaps also, after having received reliable information as to the real fighting value of the "Third Squadron," which the Baltic yards were able to put together, they read with sincere pleasure K——'s inspiring articles, which led astray not only Russian society, but what was more, the persons who held the power in their hands. Be this as it may, it is certainly worthy of note that the Japanese took no steps whatever, either directly or indirectly, through their good ally (England) to shorten our stay in Nossi-Bé, which lasted over two months.

At that time the Admiral also received purely business instructions: To bear in mind that during his presence at Vladivostok he should not make too great demands on its slender resources both as regarded stores and means of repair (they had not had time to equip the place properly when the war broke out); and also that he should not count too much on the Siberian railway, "which only managed to satisfy the requirements of the army with difficulty." In other words, he was not only required to beat the enemy and force his way through to Vladivostok, but he was given yet another task: If he should really have no prospects of obtaining the command of the sea, he was, in forcing his way through to Vladivostok, to bring with him all the means of carrying on guerilla warfare.

I have already said that the Admiral did what he could—he submitted the plans which he considered to be the only ones capable of execution, and declared quite openly that he saw no chance of accomplishing the task set to him—of obtaining the command of the sea. None the less, he was ordered to carry out this task, with the help of—God, and the reinforcements which were to be sent to him. After that how was it possible not to be successful?

It is true, a desperate effort was made to get away from the "burden." But alas! it miscarried. This is really an occasion on which one may with a clear conscience call the telegraph a damnable invention.

While we were suffering and were being used up, our strategists at St. Petersburg were working out plans in the seclusion of their offices. Seamen only as regarded their uniforms (which somehow had been conferred on them), they unhesitatingly threw dust in the eyes of people who had no conception of naval war, drafted plans of operations, and opened up perspectives which had no other basis than the conceit of their authors and the simple faith of their audience.

To lead a fleet of auxiliaries past Japan, to set the squadron the task not only of being ready at any moment for the decisive battle with a superior enemy, but also of convoying the above auxiliaries, was stupid to such a degree that even the worst strategists should not have dared to suggest such a thing. Apparently there was a way out of this, and they chose it, too, with joy; they spoke of it then and also after the war. It consisted in this: At some suitable spot we were to establish ourselves, create a temporary base, leave behind there all auxiliaries and other superfluites, and, clear of these impedimenta, endeavour to bring about the decisive battle; in the event of success—even only the clearing of the way for a short time—this was to be utilised to push through to Vladivostok with the entire "armada"; in the case of failure we were to fall back on the temporary base, replenish with stores and—act according to circumstances.

I do not propose to enumerate here all the plans of these fresh-water sailors, which included such ridiculous ones as the one referring to Petropavlovsk (Kamtchatka), which is cut off from the rest of the world not only as regards telegraph, post, and means of communication, but also as regards climatic conditions (there are constant fogs there in spring), or the seizing of the Bonin Islands, where there is no suitable anchorage for even a small number of ships, leave alone an entire fleet. These makers of projects amply proved their gross ignorance as regarded sailing directions and their incapacity as regards chart reading. It became quite clear that when deciding upon questions of naval war they had obtained their knowledge from the text-book of geography by Smirnoff (for the lower classes of the public schools), and only supplemented this by a rapid glance into Ilyin's Atlas.

As I have already said, this plan of working, if only for a short time, from a temporary base appeared to offer to a certain extent a way out of the desperate situation in which the squadron found itself, but a speedy solution of its task depended almost entirely on the assistance of the Heavenly Hosts, and was, judged by the standard of common sense, almost impossible.

This plan was much discussed in the squadron, and, of course, still more pondered over. The Admiral, anticipating that the business might take such a turn, and in the feeling that notwithstanding all his reports the authorities at St. Petersburg would obstinately stick to the rule "we know better as to the how and the when," long ago had fixed his eye on a place in the Chusan Archipelago, which lies on the road to Shanghai from the south, at a distance of 500 miles from Japan.

The anchorages of this archipelago could easily hold a fleet twice as large as ours, and were, above all, very suitable from a tactical point of view as it was easy to organise a defence against a sudden attack.¹ There were also other suitable localities on the Chinese coast, for example, Nimrod Sound.

All these plans which referred to Chinese waters had to be dropped, as the Admiral had received official intimation that England, which had apparently forgiven and forgotten Chemulpo and Chifoo, had undertaken the protection of the neutrality of Chinese territorial waters, and was prepared, in case of their being violated, to use force in upholding this protection. This was neither more nor less than a threat of war, and Admiral Rojestvensky was perfectly right when he pointed out at the end of his letter, which appeared in the *Novoye Vremya* (of 3rd January, 1906), that behind the Japanese Fleet there had stood the British Fleet.

¹ I beg the reader not to confound the Chusan Archipelago with the group of the Saddle Islands, as people often do who are not well up in geography. The Saddle Islands were quite unsuitable for our purposes.

In this manner the Chinese waters were closed to us.

The French Government took, as is known, every possible measure for driving the squadron definitely and as quickly as possible out of its territorial waters; of the English and American waters there could be no question; it only remained to search for some suitable spot in Japanese waters, of course provided it were possible to reach it without too great losses.

The Bonin Islands, Liu-Kiu, Miyako, the harbours in Formosa—only those who were unable to read charts, who had never seen the sailing directions of the Pacific, could contemplate these places. The only suitable spot was the roadstead of Mopo in the Pescadores (in the Formosa Channel). But, as I have already mentioned, the Japanese had not neglected it: the approaches had been blocked with mines; on the surrounding islands temporary fortifications had been erected, which were armed with siege guns and provided with garrisons. This base could, therefore, only be taken by force. Assuming that the Heavenly Hosts, who left us in the lurch at Tsu-shima, had given us in this case their entire support, and that we had established ourselves at Mopo without losing a ship and without serious losses in our landing parties, which would have to be disembarked for the purpose of occupying the coast, in any case a certain, perhaps very considerable proportion of our ammunition would have been expended without the possibility of replenishing it. Now, to go into action against a superior enemy without a full allowance of ammunition is tolerably risky (of course, the paper strategists pay no attention to trifles like these). However, let us assume that we could get over even this objection. What would be the next procedure? From Mopo to Vladivostok it is a matter of nearly 1,500 miles, and up to the Straits of Korea nearly 1,000. Could our fleet, which was depending on this base, on its departure for the battle in the Sea of Japan, have left the place without any protection, without anyone to man the coast batteries, which had to be armed with guns taken from the ships, without a detachment of ships to watch the approaches? Of course not! Otherwise, on the day after the fleet had gone, the newly-established base would have fallen into the hands of the Japanese, together with all its stores; and to accomplish this it would have sufficed to bring over one battalion of troops from Formosa, together with a few destroyers, or even armed merchant cruisers. On its return from an expedition which had miscarried, the fleet would have found, not friends, but enemies, and it would have been utterly houseless and homeless, robbed even of its floating base—the fleet auxiliaries. Adequate protection should, therefore, have been left behind. What should be employed for this service? If course the old ships. But if the Commander-in-Chief had already reported that with his full force he saw no prospect of obtaining the command of the sea, that is, of winning a victory in the decisive battle, then this task appeared still less

capable of accomplishment when the forces were divided. Surely this is clear!

The patent strategists, who were not concerned for the honour of the Russian name, but only with the one idea of how they could manage, by means of their pseudo-scientific arguments, to justify the decisions already come to by their protectors, thought differently. Any how, they had already provided a loophole of escape: "If in truth you see no prospect of obtaining a victory on the high seas, and are not merely in a funk, you might leave behind what you designate as a 'burden,' and push on to Vladivostok yourself. The 'burden' would then play the part of drawing the Japanese forces away from you." But this plan—getting through to Vladivostok—had already been put forward *four months ago*, when the Japanese Fleet had been weakened by nearly twelve months of strenuous war, whilst our fleet was "burning for the fray."

Then why this wearying delay of two months at Madagascar, followed by another month of aimless wanderings on the coast of Annam, which was still more enervating and used up all our remaining strength? Why were these "reinforcements" sent out which were destined to become a cheap prey of the Japanese, yet more prizes to be added to those provided by the First Squadron at Port Arthur? Was this ever thought of by those whose fundamental idea was to be accommodating, not to irritate anyone, and whose chief concern it was to be able, if need be, to get out of the water without having got wet, as the phrase goes. Now that things have come about worse than could have been expected; when every other expedient which might not have spelt such utter ruin appears almost successful, they use their loophole; but I can well picture to myself the reproaches which would have arisen from them had the Admiral come to such a decision! How they would have raged against the criminal division of forces, and the atrocious treatment of his comrades, who had been abandoned, who had been singled out as the victims, etc., etc.

However, enough of all this! History will pass its unbiased judgment.

What was there left for us to do in these circumstances? Only one thing—to do our duty to the last, to comply with our orders "to obtain the mastery of the sea," to continue the voyage, even without the prospect of gaining any success with our own forces. The only hope we had was the help of God. Perhaps a fog, a fresh breeze, might help us to slip through unobserved. Perhaps God might strike confusion into the ranks of our bold and active enemy.

In this war, however, God's blessing was with the Japanese at every step. Independently of their admirable preparations, their organisation, equipment, etc., fortune was ever on their side. The *Petropavlovsk* struck the same kind of mine as the *Pobieda*, but the former was hit abreast of the mining room

which exploded, the latter abreast of a full coal bunker; the former went to the bottom, the latter only heeled over 4° and steamed with her own engines into port to be repaired. Eventually many officers were also saved from the *Petropavlovsk*, including the Grand Duke Cyril and the captain of the ship, who had both been close to the Admiral just before the catastrophe, but Makaroff went down. . . . And on 10th August was not the shell which killed Admiral Vityest a chance shot? Certainly the *Mikasa* suffered also, and even considerably, hardly less than the *Tsesarevitch*, but Togo never got a scratch! And in the same battle both topmasts of the *Peresviet* were shot away so that Admiral Prince Uktomsky was unable to hoist any signal visible to the whole squadron. Is not that also a piece of luck? Or one can say that these were especially good shots, that it was all intentional? No; in this war the old Russian cry of "God is with us!" did not come true. God was with "them." The hopes of a lucky chance, of favourable weather conditions, which might permit us to slip past unobserved, of inattention on the part of the enemy, were very slender. And there was nothing else. I think I can confidently assert that in the fleet there was hardly anyone (except, perhaps, the quite inexperienced youths) who counted upon success in an open, decisive battle. On the contrary, there were some who maintained that the Japanese, who were perfectly convinced of their own superiority, would not only not disturb us, but would even assist us in reaching Vladivostok, as they intended blockading us there, so that when that fortress was taken the ships of the Second Squadron would become gratuitous prizes, in the same manner as had been so brilliantly successful at Port Arthur with the First Squadron. Taking this standpoint, the captain of the *Oleg*, at a conference with the Admiral, offered to bet a large sum of money that if we went on to Vladivostok and the Japanese had realised our intentions, they would not fight us, even if we met accidentally. The Admiral did not take up the challenge, as he said it would be sheer robbery on his part. He strongly held the opposite view. He believed that the Japanese would do everything in their power to prevent our reaching our only base, where we should be able to rest, to effect repairs, and put everything to rights, and where we could leave behind all impedimenta and reorganise the fighting fleet, after which the struggle with us would be far more dangerous. As they were far superior to us in fighting strength and organisation, a decisive battle on the way to Vladivostok seemed inevitable. It only remained to choose the route by which it would be easiest, with the help of God, to get through, and where, in the event of such help not being forthcoming, we should find ourselves in the least unfavourable situation.

I beg my readers' pardon, but I am obliged to dwell a little longer on this point, and to go into it yet more fully. Too much nonsense has already been written on this subject by

gentlemen who have autocratically proclaimed themselves authorities in the art of naval warfare.

The route to Vladivostok lay in any case through the Sea of Japan, which at that time was entirely in the hands of the enemy, since the Vladivostok ships gave no sign of life, and could not give any. This was known to us for certain. Four roads lead into the Sea of Japan (if Tartar Sound, with its insufficient depth, is not counted): the Straits of Korea—between the southern extremity of Korea and the Japanese Archipelago, divided into two parts, eastern and western, by the island of Tsu-shima; the Tsugaru Straits—between the islands of Nippon and Yezo; and the Straits of La Pérouse—between the islands of Yezo and Sagalien.

The only prospect of success was offered by the following idea: viz., either sudden appearance or bad weather, which we might use either to hide our movements (fog) or to avoid battle (gale of wind, heavy sea or swell). Which road were we to choose?

The Tsugaru Straits could not be considered at all. Evidently (I will be honest) even the foolish "strategists" did not take it into consideration. It is a strait which is only 9 to 10 miles wide at either entrance, measured from point to point, and if one only takes the width of the available waterway, that is, the space between the shallow waters along the two shores, the fairway is occasionally reduced to only 7 miles in width. There is a strong current. In a word, even in times of peace not even a single ship, leave alone a fleet, would risk, except in case of pressing necessity, passing through in foggy or thick weather, in which the coast-line (by day) or the lights (at night) would be obscured. To this must be added the fact that on the north shore (Yezo) the Japanese military port of Mororan was situated, whilst the naval base of Aomori lies on the southern shore (Nippon). To choose this route would simply have meant committing suicide.

The Straits of Korea, to the westward of Tsu-shima, if not really a strait, was something of the kind, for along a distance of 40 miles the mainland and the islands of the South Korean Archipelago near by approached the island of Tsu-shima within 25 miles. So far as I recollect the "strategists" did not consider this route either.

There remain two routes—the Straits of Korea, east of Tsu-shima; and the Straits of La Pérouse.

The one as well as the other possesses the general feature (to describe them graphically) of two funnels joined at their narrow ends, and opening both ways. The shortest distance between Capes Krilon (Sagalien) and Soya (Yezo) is 22 miles, but to the south-east of Krilon lies, at a distance of 11 miles, the very dangerous shoal of Kamen Opasnosti, which hardly shows above the surface of the water, and rises up sheer out of a great depth, so that its neighbourhood cannot be detected

by the lead—a very serious factor in a fog, and which reduces the width of the strait almost by one-half. As regards the eastern arm of the Straits of Korea, its narrowest part—between the southern extremity of Tsu-shima and the islands of Ikishima—measures 25 miles, showing no shoal water anywhere. The passage is quite clear close up to either shore.

Moreover, the eastern funnel of the Straits of La Pérouse does not open into the ocean, but towards the Sea of Okotsk; it is, so to speak, based on the chain of the Kurile Islands, which one has to pass when coming from the ocean before reaching the straits itself. Those who have navigated the waters of the Far East know full well from personal experience, and those who have not can see from the notes in the sailing directions what it is like near the Kuriles in spring; this is the "Empire of fogs," of which sailors speak as being 'as white as milk.'

Our "armada," which only managed with difficulty to maintain something in the shape of a formation even in clear weather and under the most favourable navigational conditions, was to pass the Kuriles in a thick fog, go through badly marked channels between the islands, safely get into the funnel of La Pérouse, avoid Kamen Opasnosti, and then, on reaching the open sea, to endeavour to get to Vladivostok! I beg leave to point out that I am now discussing the question purely from the navigator's point of view, in which I leave out of account any considerations regarding possible interference by the Japanese.

The passage through the Straits of Korea presented no such difficulties. Its funnel opens out into the Yellow Sea, quite free and up to the full breadth; in the same way at the north-eastern end it rapidly opens from 25 to 75 miles (the scene of the battle) into the Sea of Japan. Here there is ample room for manœuvring. The current could be calculated with certainty. Navigation was free from danger. The thicker the fog, the worse the weather, the better for us. Here,

¹To show how far from simple this route was, the fate of our prize, the steamer *Oldhamia*, can best be cited, as she was sent to Vladivostok that way. She was commanded by an experienced merchant seaman, T—, who had selected his assistants. He did reach the straits, but piled up on the rocks off Urup Island, and had to be burnt to avoid falling into the hands of the Japanese.

²It is sad to have to mention it, but nearly two years after the battle of Tsu-shima I had to listen, at a meeting of an honoured society, to a respected lecturer comparing this battle with the battle of Salamis, honestly persuaded that our fleet had also to pass through narrows in which the ships were only able "to steam one behind the other," whilst the opponents had full opportunity for manœuvring. My dear compatriots, how is it that you are so struck with blindness that it does not even occur to you to consult a chart and to measure the distances yourself with a pair of compasses? Is it laziness? Have you forgotten all you ever learnt, or are you so accustomed to blindly believe everything that is printed with the permission of the "superior authority"?

in this wide expanse, these were our best allies. Up in the north they were our enemies. And God alone knows which was more terrible as an enemy, they or the Japanese.

Thus spoke the old navigators, who had grown grey in the pursuit of their calling. I now come to the tactical points.

Sudden appearance.—Where was this easiest of accomplishment? To steam round Japan and through the Straits of La Pérouse, even with the exceptionally large supply of coal the ships already had on board, was impossible. We should therefore have had to coal somewhere on the way. Where? At sea?—The Pacific in the latitudes of Japan is not to be compared with the tropical regions, where the weather can be predicted all the year round by the Almanac. Here we might have had to wait for weeks without getting weather suitable for coaling at sea. The "fresh water strategists" could, of course, leave such trifles out of count, but we, the seamen, had to take it into consideration. If one cannot coal at sea one must make for the coast, enter some bay, or seek shelter behind some headland.—Where? On what coast?—Naturally, the Japanese, since no other enters into our calculations. But then how about the "sudden appearance"? Our cards were then fully exposed on the table, our route would be absolutely known, and after we had overcome all navigational difficulties, had got safely past all obstacles, had escaped with the help of God from all the traps which had been laid for us in the straits—when we had then reached the open sea again, then we should be met by the Japanese Fleet in its full strength, full of confidence, bold, and "spoiling for the fray!"

If, on the other hand, we were to coal for the last time off the northern end of Formosa (where the weather still sticks to the Almanac), and if we were then to efface our traces as far as possible, we could appear in the Straits of Korea in three days. With a certain amount of luck the principle of the "sudden appearance" could here be realised, and indeed with greater likelihood than *viâ* the Straits of La Pérouse, where there were not one but many "ifs."¹

The keeping together the entire force at the decisive moment.
When we had effaced our traces (in which we actually succeeded),

¹ Up to a certain degree this supposition was realised. It can be gathered from the official Japanese accounts that on 25th and 26th May every trace of our squadron had been lost by the Japanese. During the night of 26th-27th, Togo, who with the main body was somewhere near Fusan (probably Masampo), knew absolutely nothing of our whereabouts, and was expecting information, both from the north as well as from the south. Only at 4.25 a.m. on 27th May the Japanese armed merchant cruiser *Shinano Maru*, which had been steaming about at haphazard in the fog, came across one of our hospital ships, which were following the squadron. After she had made her out (which was not difficult, thanks to her appearance as settled by the Hague Conference—white funnels, white hull, with a complete green band and a large red cross), she concluded quite correctly that the latter was following the squadron, and

and had steered straight from the ocean for the centre of the wide funnel of the Straits of Korea, we had every cause to hope that we should be able to enter it up to our full strength, without previous losses from shoals, mines strewed in our path, or torpedo attacks. By using the Straits of La Pérouse, with the preceding passage through the Kuriles, such hope would, at the best, have been very slight.

Let us, however, assume (this view is especially favoured by our "strategists," who love to prophesy after the event) that in our passage through the Straits of La Pérouse we had been especially favoured by the Heavenly Hosts, and had had the opportunity for coaling at sea undisturbed; that on passing through the Kuriles an invisible hand had lifted the veil of fog at the right moment, and for the length of time necessary for us, and then had let it drop again so as to hide our further progress, etc. Even then they would eventually have discovered us in the centre of the fairway between Cape Krilon and Soya! For here it is not the case of a needle in a bundle of hay, but of an entire fleet. Even assuming that though they had discovered us, they had not had time to do us any damage.¹—The distance from La Pérouse to Vladivostok is 515 miles, exactly the same as from Vladivostok to Masampo, where, according to our latest information, Togo was at that time (as a matter of fact he was there). Assuming that all had gone well so far, and that he received there, where he was expecting us from the south, a short telegram: "The Russian fleet to its full numbers is passing between Cape Krilon and Soya." He weighs without special haste, and proceeds north at a speed half as much again as ours, for the purpose of cutting us off. The result would have been the same decisive fight for the command of the sea, without which we were not able to reach Vladivostok.

Now, wherein lies the advantage of the route through the Straits of La Pérouse which has been so readily championed after the event?—In the most favourable case, after all the numerous "ifs" had been successfully settled, the result was the same as in the choice of the nearest, and from a navigating

on steaming ahead she soon discovered our main body, which she at once reported.

How is this to be explained? Are we to take it to have been the result of a carefully prepared scheme of look-out ships? By no means.

The fog reduced the radius of vision to 2 miles, and along the 200 miles across the Straits of Korea the Japanese only had sixteen look-outs. If the *Shinano Maru* had passed the same spot ten minutes later she would have seen nothing. No; here again, like always in this unhappy war, one must admit with deep bitterness that God was not with us.

¹As it afterwards turned out, the Japanese had stationed a special squadron under Rear-Admiral Nakao to watch and protect the northern straits. It would, therefore, have been hardly possible to have got through with impunity, that is, without losses.

point of view most suitable route *via* the Straits of Korea—the decisive battle with the Japanese Fleet.

The moral element.—Quite apart from the ill effect which the sudden transition from a stay of six months in the tropics to the cold, foggy atmosphere of the Sea of Okotsk, where icebergs are met with even at the end of June, might have on the weakened physical strength of the crews, the general mood in the squadron, its spirit, played an essential part in the choice of route; that *moral* to which every commander is bound to attach so much value.

I have repeatedly pointed out the causes which reduced the crews of the ships to a condition which was not far removed from complete demoralisation. I shall not repeat these, but merely state that if the fleet still existed as a corporate body, this was exclusively thanks to its trust and belief in its chief and his indomitable energy. Yet it seemed to me (though I may have been mistaken) that even this tie was beginning to loosen. It was beyond their strength. When even amongst the officers, voices were heard from time to time which expressed the thought: "If only the Japanese would come and sink us!" one may well guess what went on in the depths of the masses, in the souls of these twelve thousand men, physically and morally exhausted from over-exertion!

That vague murmuring which one seemed to hear on all sides, that discontent which broke out in hideous, wild excesses—was this not the result of the instinctive feeling, not to be expressed in words, but clearly felt, that "things can't go on like this," that it "may just last out to the battle, but not for any more waiting"?

I could not help remembering those sad moments during my Port Arthur time, when, from the midst of this uninstructed mass, which has not grasped what the conduct of war means, which does not judge with the head but with the heart, there arose suddenly these unintelligible words; when that strange suspicion was uttered aloud, which up to then had only been whispered about in dark and secluded corners: "Treason! The authorities at home have betrayed us!"

Here, perhaps, it would be expressed differently. Here, perhaps, they might say: "Where are you leading us to? Again not to battle? How much longer is this to last? When will this end? Do you want to wear us out completely?"

This it was that we had to reckon with.

The decision was made. The route by the Straits of Korea was chosen.

In the (somewhat faint) hope of drawing the enemy's attention away from that spot, perhaps to cause a division of his forces, it was decided to send the *Kuban* and *Terek* ahead to the east coast of Japan, there to carry on cruiser war on the lines of communication leading to Tokio from the east (from America) and from the south (from Hong-Kong). Their

appearance in these waters could, provided they had instantly shown the greatest activity, easily cause it to be assumed that the boldness of their attitude was only to be explained by the vicinity of the fleet, which was evidently going round Japan and making for the Straits of La Pérouse.

Unhappily, these cruisers (I am unable to judge why) did not manifest their presence on the coast of Japan in any way. The Japanese had not even a suspicion that they were anywhere in that neighbourhood.

A not inconsiderable difficulty was caused by the anxious warnings received from the Naval General Staff: we were not to be a burden upon the poorly equipped and armed port of Vladivostok, and not to count on supplies by the Siberian railway. On one side the most elementary of tactical maxims bade us go into battle as little hampered as possible; and, as a matter of course, not to take any fleet auxiliaries with us which would interfere with our free movements. On the other side, we were bound to take into account these amiable communications. To send these vessels on, simply to break the blockade into Vladivostok, meant letting them deliberately fall into the hands of the Japanese, who were watching every approach to that port. To take the whole of these impedimenta with us, to be convoyed and protected by the fleet itself, was incompatible with every tactical maxim. To send these ships into some neutral port, with a view to covering their ultimate arrival by a diversion, in the event of our getting through to Vladivostok ourselves?—That might not have been a bad solution. But let us take the case of, say, a not complete defeat, or even only of considerable losses and damages, in consequence of which the fleet would have been prevented for some time from making such a diversion, what would then have been our situation? How could we have tided over this period, seeing that we were "not to be a burden upon the port, and not to count on the railway?" A compromise had therefore to be arrived at.

The Admiral decided as follows:—The warships were to take on board as much in the way of stores of all kinds as the space provided for their reception on board would hold.¹ The auxiliary steamers *Anadyr*, *Irtysh*, and *Korea* (the largest and best, having a speed of 14 knots) were to embark the largest possible amounts of such articles as were most wanted: mines, material for repairing the armament, spare parts of machinery, etc.² The repair ship *Xenia* was to hand over to the *Kamt-*

¹ These spaces (holds, store-rooms, &c.) on board a man-of-war are arranged so that they can stow the principal articles in the way of stores of all kinds for a period of four months; but as there is always a certain amount of space over, it is possible to stow larger quantities, sufficient to last up to six or even eight months.

² Besides this, these three vessels (which were of very large displacement) carried in the aggregate over 15,000 tons of coal, that is, an amount sufficient to fill up the bunkers of the fleet once.

chatka everything that the engineer-captain and the constructor on the staff considered useful, including lathes and mechanics' work benches. On the other hand, so as to gain space, the former was to hand over to the latter everything that was not absolutely indispensable; the best workmen of the *Xenia* were, if they wished it, to be transferred to the *Kamchatka*; the latter was to discharge her worst workmen and such as were not prepared to proceed to the theatre of war; six auxiliaries were to be sent to Saigon, seven auxiliaries and the repair ship *Xenia* to Shanghai.

The three above-named, specially selected vessels and the *Kamchatka* were to follow the fleet and share its fate in the attempt to reach Vladivostok. Besides this it was decided to take with us the ocean tugs and pumping vessels *Russ* and *Svir*, for the assistance of ships damaged in action or by mines, as well as the hospital ships, *Orel* and *Kostroma*. The vessels sent off to Saigon and Shanghai were, immediately on arrival there, to fill up with coal and stores, with the assistance of certain local agents, and be prepared to sail for a rendezvous which they knew of, the instant a prearranged telegram reached them.

At that time we had not definitely ceased having to reckon with international law. It never occurred to us that our supply ships, ordinary steamers flying the merchant flag, could possibly be interned in a neutral port, under the influence of England, that hospital ships could possibly become prizes, be taken to a hostile port and deprived of every possibility of fulfilling their special and only duty—to render aid to the sick and drowning.

On 14th May we sailed. So as not to weary the reader with a detailed description of the formation of the fleet, I will state briefly that the cruising formations (by day and by night) were of the same general character as the ones employed on the voyage to the coast of Annam.

The auxiliaries which had come with Admiral Nebogatoff joined our vessels of the class; they replaced the four which had been sent to Saigon. The *Monomak* joined the cruiser division under Admiral Enquist, and the four battleships were placed in rear of the battle squadron; they were formed there in line abreast. This was not done without a special reason: steaming in line abreast gives the best practice in station-keeping.

My diary will now give, briefly, as is usual when at sea, but accurately, the events in their chronological sequence.

I venture to confine myself altogether for these days to my diary, though it only contains the most necessary remarks, which are, I fear, so disconnected as to be, in part, not easily intelligible.

(To be continued.)

FORTRESS WARFARE OF THE FUTURE.

By Lieut.-Colonel GERWIEN (retired), German Army.

Translated from *Artilleristische Monatshefte*, June, 1909.

Communicated.

IN contradiction to the inferences based on the fortress warfare of 1870-71, the siege of Port Arthur has conclusively proved that it is much more difficult to carry out the close attack than the distant attack, even on antiquated "storm-proof" works, if these are held by a determined defender who makes full use of machine guns, quick-firers, electric lights, and mines.

Lieut.-General von Müller, in 1907, in his account of this siege, endeavoured to correct the popular over-estimate of the effect of artillery which has been formed since the introduction of high-explosive shell and the increase of heavy calibres; since he wrote, Colonel Frobenius, an engineer officer, in the concluding number of his great work on historical examples of fortress warfare in 1870-71, has deduced fuller and most important lessons as regards both the close and the distant attack.¹

In both works there is a manifest attempt to bridge over the gap between the gunner and the sapper which has been created by the accounts, in military literature, of the increased effect of artillery fire and the means of protection against it. Frobenius, as the later writer, several times refers to von Müller's views on this point. Yet neither author can entirely divest himself of the prejudices of his own arm. This proves only once more that knowledge won by the experience of a lifetime makes a deeper impression than academic theories. Such professional prejudices are not likely to do any harm, however, so long as each writer, while speaking up for his own arm, writes for the benefit of the army as a whole. On the contrary, the more the reader has to do with living personalities of each arm, the less likely he is to be bored with dull commonplaces. In time of war the commander of the force will not fail, if he has himself a strong personality, to make all arms work together.

¹ *Kriegsgeschichtliche Beispiele des Festungskrieges, 1870-71.* By Lieut.-Colonel H. Frobenius (retired). Vol. XII. Fortress Campaigns and Fortress Warfare (Sieges). Berlin: E. S. Mittler & Son, 1909.

Von Müller had already shown how little the Japanese, guided by European historical examples, were prepared for such a bitter struggle at close quarters. Frobenius, in the most convincing manner, shows how much more difficult it will be to storm the modern defences of a European fortress than it was to assault the antiquated bulwarks of Port Arthur. He is firmly persuaded that such defences can only be destroyed by mining, and that artillery fire is inefficient for the purpose, since splinters flying back will render it impossible to observe the effect of artillery fire from points close to the works. Von Müller, the gunner, is also of opinion that it will be very difficult to destroy caponiers intended for the defence of ditches, and similar concrete-built works, by artillery fire. But his doubts are not so much with regard to the effect of the projectiles as with regard to the accuracy required to hit these small targets, and the possibility of observation. Even at an armoured cupola, to which the range has been correctly found, the range tables show that the percentage of hits will not be satisfactory. At a concealed armoured battery, which has to be attacked by curved fire, the effect will be a matter of pure chance.

Von Müller (page 213, note 3, and pp. 218, 219) explains the slight effect of the Japanese 28-cm. (11-inch) shells on thin concrete vaults by the small charge of Shimose contained by these shells. These were coast defence armour piercing shells, made with strong heads and thick walls, not intended for attacking concrete defences. From Japanese sources, von Müller states that they contained only 9 kilogrammes (20 lbs.) of high explosive, or about half the contents of the German thin-walled 21-cm. (8.3-inch) shell.

Frobenius, following Norregaard, states on page 146 that these shell contained bursters of 30 kilogrammes (66 lbs.), which is little more than the burster of the German 21-cm. (8.3-inch) shell. However, a 66 lb. burster is only possible in a thin-walled 11-inch shell, and this is not likely to be provided for a coast-defence howitzer. Frobenius accepts Piccart's account of the effect of these shell, namely, that they mostly detonated after passing through the concrete; this points to a delay-action fuze. A thin-walled shell with delay-action fuze would probably have broken up on a concrete roof which had no covering of earth. The statement, derived from the same source, that earth coverings reduced the effect instead of increasing it, is most important. This fact is in contradiction to our own well-proved practice results, and clearly indicates that an armour-piercing shell with weak high-explosive burster was used. Even if the effect of 11-inch mine shell against concrete vaults was sufficient, at modern small concealed targets, such as double cupola armoured batteries and counterscarp galleries, their accuracy would be insufficient, and it would not be possible to observe them from captive balloons. On a siege front of six miles the small number of 11-inch howitzers available would not suffice

for this purpose. And, in any case, it would be impossible to provide a sufficient number of 11-inch shells to breach even the most important casemates on such a wide front.

Setting aside professional vanity, the artillery should be thankful to von Frobenius for relegating them to their old principal duty, namely, preparing the assault by firing on the infantry garrisons of the works and shelter trenches when they show their heads above the parapets to fire. Von Müller, writing on fortress warfare, mentions in many places the slight effect produced by high-angle fire on narrow trenches and batteries; so also General Rohne, writing on field warfare, on the occasion of the appearance of the new Manual of Field Fortification, showed convincingly that howitzers have but little prospect of hitting blindages. What is the use of one chance hit on an invisible blindage, in which, perhaps, four or five men are sitting, when the hardly-distinguishable trench for two sections of infantry, which is 165 yards long, contains some 35 blindages?

In full agreement with our latest regulations, Rohne lays down that the principal duty of artillery is to produce shrapnel effect upon the men firing from the trench. In the defence of Port Arthur the weak Russian artillery skilfully carried out these tactics against the attempted Japanese assaults, while the stronger Japanese artillery afforded insufficient support to their attacking troops, because they only fired *before* the defenders showed their heads.

No less important than his conclusions as regards artillery are the deductions which Frobenius draws from the experience of war as regards the strategic conduct of fortress warfare, and the employment of all arms in combats of this nature. These maxims must not be forgotten, otherwise the victorious advance of the army will be checked by fortresses, as happened in 1870-71, and again in the Russo-Japanese war. In the last volume of Frobenius's work strategical fortress warfare is handled separately from tactical fortress warfare, that is sieges, in order to bring into greater prominence the indissoluble connection between fortress warfare and field warfare throughout the whole campaign. In his "Principles of Fortress Warfare of the Future," deduced from a short history of the defence of the country and of the applications of fortress warfare in the 1870-71 campaign, Frobenius sums up the whole of the results arrived at in his book.

The defender must strongly fortify the principal traffic routes where they cross the rivers which protect the network of roads and railways necessary for the operations of the field armies. He must establish strong bridge-heads at these points, to be held throughout the whole duration of the campaign. But when his army crosses the river it must advance without delaying in the fortress, in order to avoid the misfortune which befell the army of Metz in 1870. In the campaign of 1866 the

necessity for engaging in fortress warfare was saved by the peace of Nikolsburg. But had it been necessary to besiege Vienna, the road by which the siege train would have had to be brought up was blocked by the fortresses of Josephstadt and Koniggrätz, for the reduction of which no preparations had been made. In 1870, after the victorious opening of the campaign, the invaders looked forward to the reduction of Strassburg as a guarantee of peace. Metz, the principal railway centre, was only to be watched, and Toul was only to be bombarded with field guns. Similarly in future wars the invader will avoid breaking up his force, in order quickly to defeat the enemy's field armies. Therefore, in his further advance he will not besiege the fortresses which do not block important roads, but will only watch them.

But the more the armies increase, the more supplies they require. Therefore the invader must in future energetically besiege, from the outset, a number of great fortresses equal to the number of lines of communication which he is obliged to establish. From the commencement, the fortress war and the war in the field must be carried on together. If, as in 1870, the war is not ended by the defeat of all the enemy's armies in the field, the whole campaign will become a fortress war. The fortresses protect the formation of new armies, which in turn endeavour to relieve them. Unless the war is to be protracted like the 1870-71 campaign, which cost more lives from disease than would have been expended in a regular siege of Metz and Paris, then preparations must be made on mobilisation to commence the necessary sieges, and these must be carried on as vigorously as and simultaneously with the campaign in the field. Port Arthur is a fresh instance of the necessity of adopting this procedure at the outset of the war.

The combat round a fortress must in future be conducted as a siege.

As early as 1870, it was proved that an unprepared assault even on a small storm-proof fort was hopeless. Bombardment is only effective against small fortified towns without sufficient bomb-proof shelter. Port Arthur has passed a decisive sentence on the attack by main force, and the siege of Paris demonstrated the futility of attempting to reduce a great city with a girdle of forts by starvation. The investment of such a city immobilizes so large a force that it can only be justified as a preliminary to a siege. If a siege is not intended, the invader must content himself with watching the fortress, to protect the lines of communication from sorties.

In future the commander-in-chief of the field army must himself make the preliminary arrangements for the siege of a fortress, since the fortress war cannot possibly be conducted independently of the movements of the field army. The force allotted for the siege must not be too small, otherwise it will be immobilized till the end of the war, as happened at Belfort.

A fortress with a girdle of 50 kilometres (31 miles) requires an investing line 75 kilometres (48.5 miles) long. To the 500 or 600 guns of the fortress the besieger must oppose at least an equal number, and these will require a front of 10 kilometres ($6\frac{1}{2}$ miles). On a front of this length only 3 divisions can advance to the attack, with a fourth in reserve. This leaves 6 divisions available for the rest of the investing line, 65 kilometres ($42\frac{1}{2}$ miles), assuming that 10 divisions have been allotted to the besieging force. The infantry will then be three times as strong as the garrison of 50,000 men, who are on the perimeter of 50 kilometres. If this force of 6 divisions be brought up piecemeal, this will not only delay the fall of the fortress but probably the end of the war. Advanced works, in front of the field of attack, can only be carried by simultaneous attacks supported by horsed heavy artillery. In the meantime the siege trains will be brought up and unloaded, and the field railways to the field of attack laid down. These preparations will in future require more time than in the sieges of 1870-71, because since then the heavy guns of the siege train have considerably increased in weight.

At Strasburg the siege train required 18 trains, each of 100 axles, and was unloaded in six days. Macalik and Langer, in their theoretical siege of the fortress of Königgrätz, reckon 90 trains for guns and a somewhat scanty first supply of ammunition. These 90 trains are to be unloaded on two railway lines in 18 days. If all goes off smoothly, a train of 100 axles takes six hours to unload, so that at most four trains per day can arrive. Macalik and Langer unload, on two railways together, 5 trains per day, or $2\frac{1}{2}$ trains on each railway. At Strasburg 3 trains per day were unloaded. At the siege manoeuvres of Langres in 1906, in difficult country, 25 days were allowed for bringing up the guns. In spite, however, of elaborate preparations, the field railway line, 18 $\frac{1}{2}$ miles long, was not ready by this time. Before Port Arthur the arrival of the Japanese artillery was delayed by the disembarkation of the siege train in Dalny Harbour, and by the heavy fighting on the advanced positions. In spite of this, in 18 days, 207 guns were brought up on a semi-circle of six miles. But the 11-inch howitzers were not among these pieces.

Dividing the attack in order to deceive the besieged as to the front selected can only prolong the siege, as was shown at Verdun in 1870. Owing to the length of the field railway the besieger will in future be still more tied down to his disentraining point. The sooner the line which is to protect this point is pushed forward, the more smoothly will work proceed, and the more time will be available for strengthening this line and preparing for the construction of the batteries. A sortie on a large scale is not to be expected until the batteries are being armed; repeated sorties would cost the besieged too many casualties, with small prospect of useful results. Building the

whole of the batteries in one night only succeeded in one instance in 1870-71, namely at Schlettstadt, on favourable ground, and on a small scale. In future, when concealed batteries will almost always be used, the work of building, even if the batteries are of the simpler form of construction, will be spread over several days; but the batteries will be armed simultaneously on the night before opening fire. In open country the defender (as shown by a carefully worked-out example in Von Müller's book) can always prevent the besieger's artillery from getting into position. In future, therefore, the selection of the field of attack will necessarily be limited to a front affording cover in the foreground. Von Müller proposes not to open fire with all batteries simultaneously; but Frobenius does not agree to this, for if the defender's artillery is at first in superior force, this superiority in fire will be more severely felt on each successive day. The decision on this point must depend upon the situation, and especially upon the number of quick-firing guns available—that is, on the possible rate of fire. Von Müller's proposal to keep a reserve in hand is in accordance with the procedure which has been followed in field warfare since the introduction of quick-firing guns. This will in the near future become the rule in fortress warfare, even with heavy howitzers.

In the artillery combat, as Frobenius rightly points out, the besieger will no longer be obliged to attempt the destruction of the guns of the fortress, but only to keep down their fire when directed against the infantry advancing to the attack. Even a complete victory in the distant combat, as at Port Arthur, by no means saves the difficult and costly advance to the combat at close quarters, because it does not achieve the complete destruction of the artillery of the defence. In field warfare, since the introduction of gun-shields, the idea of an artillery duel has been altogether abandoned; and this applies with still greater force to fortress warfare, owing to the more difficult targets afforded by the batteries. Frobenius lays stress upon this point and upon the difficulty of observation from balloons. We must also concur fully with his objection to enfilade batteries, on account of the difficulty of observing oblique fire at long distances. In the frontal artillery combat, in addition to the points enumerated by Frobenius, the defence will have the advantage of possessing fully-concealed and armoured howitzer batteries. Frobenius appears to have no great opinion of these batteries, since he only speaks of armoured cupolas visible above ground. It may be presumed that he desires principally to protect the point-blank fire of the artillery of the defence at the time when the infantry advance to the assault, whereas our foot artillery desires to afford the high-angle pieces the same protection during the artillery combat.

For the artillery combat itself, Frobenius, in opposition to our foot artillery authorities, prefers high-angle shrapnel fire.

He proposes to use high-angle fire with high-explosive shell only against the casemates of the *points d'appui* of the fortress. Whether high-angle shrapnel bullets will have a sufficient striking velocity, and how far the effect of our H.E. shell with sensitive fuzes will extend, are points upon which no definite information has been published. Up to the present, the only means of locating concealed batteries firing smokeless powder has been taking cross-bearings to the flashes at night. Therefore in war such batteries will mostly have to be attacked by searching and sweeping. And for this purpose the most suitable method of fire is that which gives the greatest number of effective hits to the square metre. It is possible that at concealed targets the time fuze will give more bursts capable of being observed when ranging. It is to be regretted that our foot artillery guns have not shields to protect them against the enemy's shrapnel, even when firing from behind cover.

While the artillery combat keeps the artillery of the defence fully employed, the besieger must establish the superiority of fire of his infantry, advancing by successive stages, from the covering position up to the point from which the assault is to be delivered, along a front of two kilometres ($1\frac{1}{2}$ miles). Von Müller had already deduced this conclusion from the siege of Port Arthur. Frobenius gives a detailed and convincing account of the manner in which this will be done, basing his procedure for obtaining superiority of fire on Rohne's "Schliesslehre für Infanterie." He considers that the shelter trenches of the attacking infantry must be provided with blinded cover against shrapnel fire. Their fire-effect must be concentrated by the use of machine guns and field guns pushed forward to close quarters. Von Müller wishes to push forward light howitzers as well. Communication trenches from the rear must be provided.

In the course of the gradual advance of the attacking infantry, during which desperate combats with the defender's outpost works will take place, each division will capture fresh positions for the advanced artillery. These batteries must be pushed forward to engage the small armoured targets, and the carefully hidden guns, which can only be fired on at short range; these guns correspond to von Müller's "guns to sweep intervals."

The description (from sources on either side) of the Japanese attack by main force on Port Arthur, after the Russian artillery had been completely mastered, shows conclusively that this method of shortening the siege must always fail, even against inferior fortifications, on account of the increased power of modern fire-arms.

In the close attack, the besieger has no longer to deal with outposts protected by field fortification, comparatively easy to break through, against which the ground possibly allows of covered approaches. He has now to achieve superiority of fire against the continuous girdle-position, with storm-proof sup-

porting points. These will be so selected that the foreground affords no cover to the attack. During this period the defender will be getting closer to his supports, and the besieger will be getting further and further from his covering position. According to the experience of Port Arthur, these accumulated difficulties are not to be overcome by a simultaneous assault on the converging sections allotted to the divisions. For it is easier to break through the intervals between the works, and then to carry out an enveloping attack on the storm-proof works.

Next follows a separate attack on the ditches and obstacles. The engineers must push forward parallels without intermission, and must finally have recourse to mines, and so prepare the way for an infantry assault from a point close up to the work. The artillery cannot accomplish this, because, although they can breach the escarp, they cannot destroy the counterscarp with its galleries for the defence of the ditch. They cannot, therefore, prepare the way for a descent into the ditch. Moreover, the splinters which fly back would endanger their own observing posts and the garrisons of the trenches, so that the enemy would be able to repair the damage caused by any chance shots without being observed. Before Port Arthur the artillery was unable to cut passages for the assault through the wire entanglements, although these consisted of only three rows of pickets. The principal duty of the artillery in the close as in the distant attack will be to cover the assault by firing on the defenders who man the parapets, and by engaging any guns which the defender may have kept in reserve.

Before pushing forward the parallels close up to the enemy's main position it is necessary to reconnoitre thoroughly the minor folds of the ground, the nature of the soil and the depth at which water stands. For protection against the concealed guns kept in reserve, which will come into play at distances of 440 yards and under, the infantry covering position will often require to be provided with traverses and with blindages for protection against the fire of light howitzers.

Before Port Arthur the stronger sorties for the purpose of blowing up the besieger's works were mostly made under cover of the blinding rays of the electric light. Frequent attacks were made by small parties at night, and severe losses were caused by hand-grenades flung into the trenches. According to the bitter experience of the Japanese, the storming position must not be kept back at from 220 to 330 yards from the works, with the idea of avoiding short rounds from the besieging artillery, but must be pushed close up to the obstacles so that these can be reconnoitred and destroyed without excessive loss. This is more likely to succeed against the weaker obstacles of the defences of the intervals than against strong works placed one behind another. These must then have an enveloping attack delivered on them before the assault.

*As regards the assistance to be afforded by the engineer, Frobenius shows conclusively that in future it will be impossible to advance across the open from the storming position to the obstacles. He adduces the heavy losses suffered by the Japanese in clearing away the comparatively weak wire entanglements before Port Arthur. He then considers in detail the methods of clearing away the whole rows of modern obstacles in front of each work, and shows the impossibility of effecting this in the beams thrown by the defender's electric lights. He considers it necessary to advance by sapping through the obstacles, and to blow in the counterscarp. This enables a descent into the ditch to be effected, and so saves the necessity of descending into the ditch with scaling ladders, or of "smoking out" the defenders of the counterscarp galleries, which is an impossible method. If these galleries are only thinly covered with earth it is impossible to destroy them by sinking shafts straight down upon them, since the mines blow out without destroying the roof, as occurred at Port Arthur on several occasions. The delay caused by the above-mentioned operations will be less than that caused by repeated failures of assaults above ground, such as we at present propose to employ. These failures must reduce the *moral* of the attack.

If the engineer does not take to heart this warning, based on the experience of Port Arthur, he is open to the same reproach which Frobenius makes to the artilleryman, that, by over-estimating the effect of his arm, he has caused peace-time preparations for the close attack to be neglected. It will be seen that Frobenius, the engineer officer, is an impartial judge, and that his proposals are not influenced by professional pride, but are based upon the experience of war, to which his whole work is dedicated. It is to be hoped that his serious conclusions will not only be weighed and taken to heart in high places, but that officers of all arms will be induced to study fortress warfare as it has actually been carried out in war. A description of fortress warfare, which deals not only with war experience, but with the best method of turning it to account in the future, is really not so tedious as to cause officers to turn away from it with a shudder. On the contrary, its study produces the firm conviction that all officers must be familiar with this subject, unless the decisive result of the campaign is to be delayed, as happened in 1870-71 and at Port Arthur.

THE PRESENT STATE OF THE RUSSIAN ARMY.

Translated from *Danzer's Armee-Zeitung*, 18th November, 1909, p. 3.

I.—THE VIEWS OF A DISTINGUISHED RUSSIAN OFFICER.

The Treaty of Portsmouth was concluded at a time when the Russian Army had completed its concentration at a distance of some 6,000 miles from its base, and had made good its losses in personnel and equipment. But although it was common knowledge at the time that other than military reasons forced Russia to make peace, its conclusion at this juncture gave rise to unfavourable opinions regarding the Russian Army.

Yet Russia cannot be said to be weak in a military sense. A cursory survey of the general structure of her army points to very different conclusions.

The army is as strong as ever it was, and the recent efforts of the Government to increase its readiness for war have not been in vain.

Its peace strength is about 1,200,000 men. Upon mobilisation its strength can be raised to 4,000,000, without including the *Opolchenie* (*Landsturm*). This reserve consists of partially trained and totally untrained men, and its numbers can be swelled to an enormous extent.

The moral of this huge army is perfectly satisfactory. This may readily be judged from the events of late years, when the army bore the burden and heat of the day in combating the revolutionary movement in Russia, and fulfilled its task admirably, in spite of the efforts of the revolutionaries to undermine the loyalty of the troops and use them as a tool. There were a few unimportant disturbances in certain units (artillery and engineers), which met with no sympathy on the part of the army generally, and were, as a rule, quickly suppressed.

As regards the training of the troops, the Russian Army possesses a valuable asset in the great numerical strength of its corps of officers and non-commissioned officers, most of whom have the experiences of a great war behind them.

Fresh officers have been appointed to hold the various commands, and the age limit for generals has been lowered.

Musketry instruction has been placed upon a firm basis. The tests applied during the last few years by the Inspector

of the Forces show a progressive increase in efficiency from year to year, and the results now obtained compare very favourably with those of former years.

Machine gun detachments are now also subjected to practical tests every year. The inspectors report steady progress, and that the army generally is yearly increasing its knowledge of machine guns.

Searching inspection of small arms has shown that the rifle is, generally speaking, perfectly adapted for war, and, notwithstanding Press statements to the contrary, thoroughly capable of resisting wear and tear. Annual condemnation of unserviceable parts guarantees the perfect condition of arms generally. The war reserve of rifles and ammunition in European Russia and Turkistan is reported to be in perfect order, and the quantity is equal to any demand likely to arise.

Marked progress in tactical instruction has been made. Special attention is paid to the instruction of the soldier as an individual rifleman, and his employment as such in battle. The troops are constantly exercised in the construction of redoubts and shelter trenches.

During the past summer it was found possible, thanks to the release of the troops from their duties in aid of the civil power, to devote the training season entirely to tactical instruction. To this end large concentrations for corps manoeuvres were carried out.

For the last three years numerous experiments have been made with a view to reforming the system of interior economy in the army. This system, which provides that all articles of clothing are to be manufactured by the troops themselves, withdraws too many men from the ranks, and is also a burden upon regimental commanders. A reform is contemplated which will give relief to the last mentioned and enable them to devote their entire attention to training. Regimental commanders will in future merely demand and account for clothing and equipment and be responsible for their upkeep. The duties as regards supply, &c., of clothing and equipment will be transferred to the Intendance Department, officials of which will be attached to units accordingly. This reform has been experimentally introduced in the Xth Corps and in other units; it will shortly be extended to four additional army corps.

The training manuals and other regulations are being subjected to a thorough revision in accordance with the teachings of the last war. The new manuals comprise Infantry Training, Field Fortification, and Musketry Instruction. Officers who took part in the last war have alone been consulted in their compilation. Ten other manuals have recently been published, *e.g.*, Instructions for Training; Recruit Training; Instructions for Infantry Training; Regulations for Regimental Duties, &c.

The reorganisation of the Nicholas General Staff Academy is of special importance. The syllabus of instruction has been re-cast, and the Academy has now been converted into an institution for the general military education of officers. All graduates now return to their units, and those most favourably reported on are appointed to the General Staff as vacancies occur, and thenceforward enjoy special privileges as regards promotion and selection for the higher appointments.

The comparatively long time which the army requires for its mobilisation and strategic concentration has hitherto been considered one of its weak points. The causes of this must be sought partly in the army itself, partly in the great area of the Empire, the thinness of its population, and the small development of the railway system. The density of the population in the most populous districts of European Russia is only one-third of the mean density of population in Germany and one-half of that in Austria. The Russian railway system, in point of development, also lags far behind those of Germany and Austria.

These defects have long been recognised by the Russian military authorities, and steps are gradually being taken to remove them. Every effort is being made to increase the mobilisation efficiency of the troops and reduce the time required by the reservists to join. In the light of the experiences of the Russo-Japanese War, a new method of compiling the control lists and calling up the reservists has been introduced, and the arrangements for mobilisation as affecting the civil authorities and the troops have been revised. The army reserve has now been divided into two classes, and a territorial redistribution of reservists to units has been effected. With a view to testing the machinery of these new measures, the General Staff ordered a trial mobilisation to be carried out last April, the 138th Infantry Regiment, stationed at Ryazan, being selected for the purpose. Both reservists and horses were called up.

The mobilisation came as a complete surprise, but the reservists assembled punctually and quietly, only 6 per cent. of the requisite 4,000 failing to appear, notwithstanding local difficulties due to inundations. The physical condition of the men was excellent, and the percentage of medically unfit was below that allowed for in the plan of mobilisation. The mobilisation of horses also went off exceedingly well, the animals supplied being punctually delivered and of good quality. The results obtained pointed to the conclusion that upon a general mobilisation being ordered there will be an ample supply of horses of the proper stamp.

The work of forming the regiment went smoothly. The mobilisation equipment was complete and in good order. It should be remembered that the 138th Regiment is quartered

at a distance from the frontier, and that the regiments quartered in the frontier districts have a higher peace strength and are more ready for war than those in the interior. This regiment is among those which suffered most severely as regards personnel and material in the war of 1904-05.

The system of trial mobilisation is to be considerably extended in the near future. The next mobilisation will probably take place in the western frontier districts.

The railway system is being steadily developed, strategic requirements being always kept in view, and the carrying capacity of the existing lines which lead westward is constantly being increased. The laying of a second track on the Bryansk-Brest Litovsk line and the completion of the Bologoe-Syedlets line should be specially noted in this connection.

Most of the Russian railways are fully equal to mobilisation requirements. The requisite rolling stock and other material is available, and is kept in proper repair under military supervision. Readiness for war is also frequently tested by means of surprise orders for mobilisation issued at various points.

The disastrous war with Japan seriously affected the economic structure of the army, and the work of replenishing and completing the warlike stores has been energetically carried on during the last two years. Large sums, the expenditure of which is to be spread over five years, were voted for this purpose by the Duma on the 16th July, 1908. The stores necessary upon mobilisation are now ready, and the main depôts are being rapidly filled, and will soon be complete.

The Russian Press has recently alluded to an alleged intention to abandon the Vistula fortresses, but it is ill-informed as to the details of the proposed new organisation. The Russian War Office has set itself the task, not of razing the fortresses in question, but of instituting a new system of defence, involving the replacement of various works by new ones. The changes of the last 20 years in the distribution of the armies, both of Russia and of her neighbours, have naturally altered the whole of military development and consequently the plans of operation as well. The technical reconstruction of the area of operations must be taken in hand, and the prospective operations of the army must be co-ordinated with the fortification of this area.

The value of fortresses is great, but only when they are few in number and well placed, and are consequently a source of strength instead of weakness, for their garrisons necessarily diminish the strength of the field army, which, after all, represents the only means of gaining final victory.

The opponents of this view, who claim that fortresses are the decisive factor in war, usually base their arguments upon

three specially tempting examples in the history of fortress warfare—Sevastopol, Plevna, and Port Arthur.

Sevastopol was not a fortress in the proper sense of the word. The place was fortified on the sea front, but on the land side there were only a few hasty works. With the scuttling of the Black Sea Fleet and the destruction of the dockyard its value as a naval base vanished, and the continuation of the struggle for its possession was not justified by any material grounds. The exhaustion of the Russian Army, and not the fall of Sevastopol, decided the issue of the Crimean War. It is difficult to say how the war would have ended if the Allies had captured the place in the first few days and had been obliged to penetrate into the interior of the Crimea in order to continue hostilities.

The loss of Sevastopol, considered as a geographical point, was of small importance, but Russia staked her all to defend it, and the defeat of this all by the Allies proved decisive. In the war of 1877-78 the Turks possessed a quadrilateral of fortresses on the left flank of the Russian Army, but, in spite of their threatening position, these fortresses failed to influence the course of events in any way whatever. At the same time, on the Russian right flank, arose Plevna, a position selected haphazard and comparatively slightly fortified, but one in which a field army was concentrated. Plevna engaged the whole attention of the Russian Army for months, but, geographically of small moment, its importance lay in the fact that it formed the area of concentration of the Turkish Army. If Osman Pasha had succeeded in cutting his way out he might have founded a second Plevna, and fresh exertions and sacrifices on the part of the Russians would have been necessary in order to cripple his operations.

The examples of Sevastopol and Plevna clearly show that the value of a fortress depends entirely upon the strength of the field army pivoting upon it and operating within the area dominated by it. Living armies, and not inanimate works, are the decisive factor in war.

Port Arthur furnishes a contradiction of the principle just enunciated. The Japanese, although by shutting up the Russian Fleet in Port Arthur they had gained complete command of the Yellow Sea, proceeded to lay siege to the place, and tied down an army of 100,000 men for the space of nearly six months. It would have been simpler, more decisive, and strategically sounder if the Japanese, after Nan-shan was won, had contented themselves with shutting in the Russian troops in Kuan-tung and had turned with all their forces against the Russian Army in Manchuria.

But here sentiment outweighed strategy. To tear Port Arthur from Russia was the ardent ambition of every Japanese. It was the goal which the nation had set up for itself.

Thus we see that the importance which attached to Port Arthur was purely fortuitous. It was important, not as a fortress, but as a locality which Japan coveted.

St. Petersburg is to-day a scene of untiring military activity. All the higher military authorities and also numerous committees are engaged with the problem of reorganising and strengthening the military power of the State.

II.—A REPLY.

We submitted the foregoing article to a correspondent who has a very thorough knowledge of the Russian Army. He makes the following remarks:—

I consider the article to be exceedingly wide of the mark, in spite of its numerous data, for the latter, even if they be accepted as correct, by no means prove that the Russian Army of to-day is ready to take the field. Its recent breakdown was due, not to defective organisation and tactics, but to *the utter incompetence of its leaders in all grades, to their inability to think and act for themselves*. This fault cannot be eradicated in a few years. It is deeply rooted in the poorly educated corps of officers, and more deeply still in the national character. So long as this defect exists, so long as the Russian officer remains untrained to independence and initiative, so long as there is a want of leaders prepared to accept responsibility, the Russian Army will be unable to urge a great war with success. This opinion is shared by all impartially thinking Russian officers, and there are a good many of them.

The writer of the article is apparently one of those self-satisfied optimists who hold that perhaps all was not quite right with the army, and that reforms are not called for. They forget what harm they do to the army by trying to hide its cardinal defects. But there are unprejudiced and clear thinking men in the army who do not shrink from laying a finger on the weak points, nor from examining them and inquiring into their causes. In reply to the writer of the article under review, I quote the views of a Russian officer from the periodical *Razv'yedchik*. "... Precisely the same ideas (as those of the Russian optimists) invaded the minds of the Prussians after the Battle of Valmy, in which they had been routed by the despised and ill-disciplined troops of the French revolutionary army. They saw that all was not quite right, but tradition was too strong, and nothing was done. Napoleon's victories could not dispel their self-conceit, and nobody realised that Frederick's army had become an antiquated and inert mass. In July, 1806, Blucher expressed the opinion that the French would never beat the Prussians, and three months later the remnants of the Prussian Army fled from the fields of Jena and Auerstadt. As we know, the Prussian Army found the

power of regeneration within itself, and only six years later was fit to cross swords again with its conqueror. The accomplishment of this great work was due solely to the *recognition that the causes of defeat were to be found in the army itself, and that it was futile to blame individuals.*"

Does the Russian Army recognise this? Has it the strength to regenerate itself? The article under review does not point to that conclusion. It seeks to gloss over and lull to sleep when frank admission of error and hard work are called for.

Now as to the arguments contained in the article.

It is absurd to talk of "*an untimely peace*" (Kuropatkin used the same expression); peace was a *necessity* to the army; in spite of its superiority in numbers, in spite of the undeniable devotion and endurance of the Russian soldier, the army had completely lost confidence in its leaders; its *moral* was gone; led as it was, victory was impossible.

"The army is as strong as ever it was." This means nothing. Its great numbers will, of course, always render it worthy of respect. But its *strength* has never been proportionate to its numbers, and its weaknesses were as patent in the Crimea and in Bulgaria as they were in the last war.

The article lays stress upon the *war experiences of officers and non-commissioned officers*. Does not the writer know that the composition and educational attainments of the *corps of officers*, not to mention the non-commissioned officers, form the *weakest point* of the whole military structure? The regimental officers and the men, to give them their due, fought bravely, but the higher leaders showed themselves totally unequal to their work. The causes of this have been indicated in the first paragraph of this review, and until a thorough reform has been effected the army will never have efficient leaders.

We can readily believe that the troops are constantly exercised in the construction of *redoubts and trenches*. It was their chief occupation in the recent war.

The writer's statements as to the issue of new *regulations* are incorrect. The army has not yet received a single manual based upon the strategical and tactical teachings of the war. The infantry has only received a new *drill book*. No new Field Service Regulations have been issued. *Nothing* has been done in this direction, although committees appointed for the purpose have been sitting in St. Petersburg for years. The Russian Army is about the only one which has not received a new training manual.

The writer's description of *trial mobilisations*, which in other armies are considered a matter of routine and hardly worth mentioning, *proves nothing*, and shows that he hardly knows upon what the efficiency of any army depends.

In conclusion, he mentions the various committees now sitting at St. Petersburg. I have already dealt with this point. The committees have been sitting for four years and have effected nothing.

My opinion is that the Russian Army is at present barely in a condition to wage a great war. Its present leaders fully recognise this. There can be no improvement until the nation and the army realise that the causes of defeat do not lie in bad luck or the incompetence of individuals, but in the want of culture of the whole people, in the absence of steady desire for improvement, in the defective education and training of the officers, in the want of a strong and efficient body of non-commissioned officers, &c. Until the nation and the army seek the causes of defeat within themselves and reform themselves the army cannot attain to the required standard of improvement, nor will it be assisted to this end by optimistic views, such as are expressed in the monograph under review.

NAVAL NOTES.

The following are the principal appointments which have been made:—

Home. Vice-Admiral—G. F. King-Hall, C.V.O., to be Commander-in-Chief on the Australian Station. Rear-Admirals—R. H. Peirse to be Rear-Admiral in the First Battle Squadron, Home Fleet; R. B. Farquhar to be Rear-Admiral in command of the Fourth Sub-Division (Plymouth) of the Home Fleet. Captains—H. J. Savill to *Hermes* as Flag-Captain to Rear-Admiral Bush, M.V.O.; F. D. Gilpin-Brown to *Jupiter* as Flag-Captain to Rear-Admiral Limpus; G. H. Baird to *Shannon* as Flag-Captain to Rear-Admiral Sir G. Warrender, Bart., C.V.O., C.B.; R. A. Nugent to *Leander*; Hon. H. E. Holmes A'Court to *Revenge*; N. Grant to *Sapphire* and command of Fifth Destroyer Flotilla; E. M. Phillpotts to be Superintendent of Signal Schools; R. A. Hopwood to *Prince of Wales* as Flag-Captain to Rear-Admiral Sir John Jellicoe, K.C.V.O., C.B.; E. F. Bruen to *Powerful* and as Flag-Captain to Vice-Admiral G. F. King-Hall, C.V.O.; G. A. Ballard to *Britannia*; R. M. Harbord to *Euryalus*. Commander—G. M. Marston to *Blanche*.

Royal Marines.—Colonels—C. G. Brittan to be Colonel Commandant, Plymouth Division; C. L. Gordon to Colonel Second Commandant, Plymouth Division.

Rear-Admiral A. H. Limpus hoisted his flag on the 17th ult. on board the *Jupiter* at Portsmouth in command of the Portsmouth Sub-Division, Home Fleet, in succession to Rear-Admiral F. E. Brock. Rear-Admiral Sir G. Warrender, Bart., C.V.O., C.B., hoisted his flag at Portsmouth on the 29th ult., on board the *Shannon*, in command of the Second Cruiser Squadron, Home Fleet, in succession to Rear-Admiral R. S. Lowry.

New Ships.—Want of space has prevented our noticing earlier the launch at Portsmouth on 20th August last of the new first-class battleship *Orion*. She is the fifth ship of the *Dreadnought* class to be launched at Portsmouth and her displacement, it is generally believed, is more than 2,000 tons greater than that of the *Neptune*, which preceded her on the slip.

Apart from her size and guns of larger calibre, the marked characteristic of the *Orion*, in distinguishing her from the ships launched before, will be in the disposition of the guns of the main armament, which will all be placed in the centre line of the vessel, whereby, with the exception of head and stern fire, the whole will be able to be brought into action on any bearing from the bow to the quarter, thus making the angle of concentrated fire much greater than in that of her predecessors. In the *Neptune* and her sisters, the *Hercules* and the

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Colossus, a larger angle of broadside fire over that of the earlier ships is obtained by the placing of the side turrets *en échelon*, which enables the fire from those turrets to be directed on the broadside, and as far as 45° before and abaft the beam, and brings all guns into action on those bearings.

Great secrecy has been maintained as to the details of the ship, and nothing authoritative has been published; but, according to the *Times*, the following particulars are believed to be correct:—Length, 545 feet between the perpendiculars, and 584 feet over all; beam, 87 feet; displacement, 22,500 tons, her launching weight having been approximately 8,000 tons. She is to be fitted with Parsons turbine engines of 27,000-H.P., working four shafts and four screws, each having an ahead and astern turbine; her estimated speed will be 21 knots, the steam being furnished from 18 water-tube boilers. Her coal capacity will be 2,700 tons, and she will also carry 1,000 tons of oil fuel. The armoured belt will vary in thickness from 12 inches to 4 inches.

The main armament will consist of ten 13·5-inch guns, disposed in five turrets (two guns in each), placed in the centre line of the ship. The second and fourth turrets are to be raised so that their guns can fire over those of the first and fifth; thus four guns will be able to fire directly ahead and the same number astern, while all will bear through the angle from the bow to the quarter. The broadside fire will, therefore, be much superior to, and the weight of metal thrown much heavier than in the case of the *Neptune* class, though the direct head and stern fire will be less, as the *Neptune* can bring six of her 12-inch guns into action ahead and eight astern. There will also be three submerged torpedo tubes. The *Orion* will only have one tripod mast, while her secondary armament will, it is believed, be composed of 4-inch guns similar to those of the *Neptune*.

Work on the ship is proceeding apace at Portsmouth. According to the latest reports, about two-thirds of the side armour is already in position, the boilers are all on board, and the port turbines are now being placed in the ship.

Another important launch in August was that of the new armoured cruiser *Lion*, which took place at Devonport on the 6th of that month.

She is a considerable advance in length and tonnage on the *Indefatigable* and other vessels of the cruiser-battleship type. Her dimensions are reported to be as follows:—Length, 700 feet, or 720 feet over all, as against the 596 feet of the *Indefatigable*; beam, 88 feet 6 inches, or 8 feet 6 inches more than that of the *Indefatigable*, while the displacement of the two ships are 26,000 tons and 20,000 tons respectively. The turbine engines of the *Lion* are to develop 70,000-I.H.P., giving a speed of 30 knots, as compared with the 45,000-I.H.P. and 27 knots speed of the *Indefatigable*, and she will also have a coal capacity of 1,000 tons greater than the earlier vessel.

The main armament of the *Lion* will consist of eight 13·5-inch guns arranged in four central turrets. Her armour protection will extend from the upper deck to about 7 feet below the water-line, and will be not only greater in extent than in the *Invincibles*, which have only an armour belt, but will also have about 30 per cent. more resisting power. In the

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arrangement of the barbettes provision is made by raising the second and third above the foremost and after ones, for all the guns to be fired both ahead and astern. The whole of the main armaments will also be trainable on either broadside. The bilge keels, which are of unusual width and length, are designed so as to form a pair on either side, connected by a narrow strip in line with the centre section.

The Visit of the United States Fleet.—The Atlantic U.S. fleet, which is now visiting this country and France, is the most powerful fleet that has ever crossed the Atlantic. Like the one which two years ago Rear-Admirals Evans and Sperry took round the world, it consists of 16 first-class battleships, but it is a more formidable one, as it includes the *Delaware* and *North Dakota*, the two first *Dreadnought* battleships to be commissioned for the U.S. Navy, and which are now making their first long cruise. The fleet, the ships of which left Boston and Philadelphia on 2nd November for a rendezvous 250 miles at sea, is under the command of Rear-Admiral Schroeder, who has his flag in the *Connecticut*. It is in four divisions, and is composed as follows:—

First Division.

First-Class Battleships.—*Connecticut* (flagship of the Commander-in-Chief), *Delaware*, *North Dakota*, *Michigan*.

Second Division.

First-Class Battleships.—*Louisiana* (flagship of Rear-Admiral Vreeland), *Kansas*, *South Carolina*, *New Hampshire*.

Third Division.

First-Class Battleships.—*Minnesota* (flagship of Rear-Admiral Murdock), *Vermont*, *Mississippi*, *Idaho*.

Fourth Division.

First-Class Battleships.—*Georgia* (flagship of Rear-Admiral Howard), *Nebraska*, *Rhode Island*, *Virginia*.

On arrival in the Channel the fleet broke up, the First Division proceeding to Portland, and the Third Division to Gravesend, where they arrived on the 16th ult., the Second and Fourth Divisions proceeding to Cherbourg and Brest respectively, where they also arrived on the 16th ult. On the 8th inst. all the four Divisions left the ports they have been visiting; the First and Third Divisions proceeding in their turn to Cherbourg and Brest respectively, while the Second and Fourth Divisions crossed to Portland and Gravesend respectively. The different divisions leave the English and French ports, according to present arrangements, on the 30th of this month, and after rejoining the flag of the Commander-in-Chief, the whole fleet proceeds to the West Indies. The average speed maintained in crossing the Atlantic appears to have been 10 knots.

The first-class battleship *Dreadnought*, flying the flag of Admiral Sir W. May, Commander-in-Chief of the Home Fleet, with the first-class battleships *Bellerophon*, *Superb*, *Temeraire*, *St. Vincent*, *Collingwood*, *Vanguard*, and *Agamemnon*, and the first-class armoured cruisers *Indomitable* and *Invincible*, were at Portland to welcome the U.S. ships.

It may be of interest to recall that the two American *Dreadnought*

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battleships, the *Delaware* and *North Dakota*, are vessels with a displacement of 20,000 tons, and in addition to their main battery, composed, like that of our own earlier *Dreadnoughts*, of ten 12-inch 45-calibre guns, they also carry a more powerful anti-torpedo defence armament of fourteen 5-inch Q.F. guns, which for the most part are mounted in a central battery behind armour protection. All the big guns are on the centre line of the ship, this being a characteristic feature of the turret arrangements in American designs, two of the turrets being raised above the others in order to obtain a sufficiency of right ahead and right astern fire and this method of placing the turrets is the one now adopted for our latest ships, as giving the advantage that all the guns can be fired on either broadside. Thus, while the *Dakota* and *Delaware* can bring all ten of their 12-inch guns to bear on either side, our earlier *Dreadnoughts* including the *St. Vincent* and her sisters, can only bring eight. On the other hand, the end-on fire of our ships is heavier.

In one important respect, the two U.S. ships differ materially, the *Delaware* being fitted with reciprocating engines, while the *North Dakota* has the Curtis turbines, which have given that ship a slight advantage in speed, she having made 22.25 knots over the measured mile, as against the 21.98 knots of the *Delaware*, both ships having been designed for 21.

The following are the principal appointments which have been made:—

Vice-Admirals—J. Bellue to be Commander-in-Chief of the First Squadron; N. Kiesel to be Commander-in-Chief of the 1st Arrondissement Maritime (Cherbourg). Rear-Admirals—A. V. Adam to command of Cruiser Division of 2nd Squadron; B. S. H. Sourrieu for service at the Dockyard at Brest. Capitaines de Vaisseau—M. P. L. Jaurée to *Liberté*; F. J. De Bon to *Condorcet*; E. F. Fournier to *Bouvet*. Capitaines de Frégate—M. H. Vesco to *Chasseur* and command of a division of the Destroyer Flotilla of the First Squadron; H. L. Philippe to Capitaine de Vaisseau.—*Journal Officiel de la République Française*.

The Naval Manœuvres (continued): 3rd Theme.—The third phase of the manœuvres resolved itself practically into a series of tactical exercises.

On the evening of the 30th May, the six battleships of the First Squadron anchored off Salins-d'Hyères. The next morning they weighed and stood out to sea, steering to the southward. The light division, having completed their coaling, weighed at 11 a.m. of the same morning and left Toulon to rejoin the main body of the squadron.

The Second Squadron also completed coaling, before proceeding to sea from Toulon to carry out a sham attack against the seaward fortifications of the port, as well as to attempt the forcing of the entrance channels.

In order to repel the attack, Vice-Admiral Jauréguiberry, the Maritime Prefect, issued on the 31st at noon an order to mobilise, and the troops were all soon in their respective stations. The Chief of the Staff of the 5th Arrondissement (Toulon), Rear-Admiral Dufaure de

France

Lajarte, repaired early in the afternoon to Saint-Mandrier, where he installed his headquarters at the semaphore station at the Croix-des-Signaux, from which point a complete command of the harbour and open sea was obtained. In the meantime the mine fields were connected up, booms got into place, and all the other measures of defence taken.

By midday of the 31st, the blockade of Toulon was established by the cruisers and destroyers of the *Red* fleet (for details of the two fleets, see Naval Notes (France) in October No.). During the night, the *Blue* cruisers *Marseillaise* and *Condé*, with the destroyers of the *Blue* side, succeeded in passing, unnoticed, through the lines of blockade. At 3 a.m. the *Foudre* was discovered and fire opened upon her, when she attempted to lay down mines at the entrance to the large roadstead.

On the 1st June, the *Blue* Squadron weighed, drove off the blockading squadron, and then cruised in front of the defence, when a dense fog came down, under cover of which some of the *Red* destroyers made an attempt to creep in, but were discovered and driven off. Operations of this kind, however, lead to very little, except to give opportunities for a certain amount of practice to the destroyers and submarines, and but little real instruction is to be gained from them. The main bodies of the two fleets twice met and engaged, the result in each case being a draw, and on the 4th June the operations came to an end, there being neither, in the words of the Chief Umpire, "victors nor vanquished." After recoaling, the two fleets again proceeded to sea on the 8th June, and during the next four days were employed for the most part in tactical exercises, the two fleets operating against each other. It is stated that the new system of tactics introduced by Admiral Fournier were again tested, but no official report has yet been made on the subject. The manoeuvres were finally brought to a close on the 12th June, when both fleets returned to Toulon before dispersing.—*Précis from La Vie Maritime.*

Seamen's Dress.—A circular issued by the Minister of Marine on seamen's dress states that the committee appointed to consider the matter will soon make its report, but existing stocks of clothing will continue to be issued till exhausted.

The circular goes on to say that the Minister of Marine's attention has been called to irregularities in the dress of men when on leave, and points out the penalties that should be enforced for in any way altering the cut of the regulation clothing, which is strictly forbidden. Any alterations made must be the work of the ship's tailor, and then only with the view of obtaining a good fit.

No alterations are to be made in the caps, which are to be worn as issued together with the whalebone stiffening necessary to preserve their shape. Orders are also given that both on board and ashore a strict supervision is to be exercised over the men's dress.

Aspirants of the First Class.—Aspirants of the First Class are in future to be called *Enseignes de Vaisseau*, Second Class. The reason given for the change is that the title of Aspirant has been lately adopted by the Minister of War in the Army for pupils in the non-commissioned

France.

officers' schools, and it was therefore considered unsuitable to continue the use of it in the Navy, where Aspirants correspond with the higher rank of sub-lieutenant in the Army.

New Ships.—The Minister of Marine has directed the Prefet Maritime at Lorient to hasten on the construction of the new 18,500-ton battleship *Mirabeau*; 1,300 workmen are now employed on this vessel. The heavy guns assigned to the *Diderot*, building at Saint-Nazaire, but not so far advanced, are to be supplied to the *Mirabeau*, so that the latter may be ready for commissioning as soon as possible.

The contract for the supply of the six two-gun turrets of the new 23,500-ton battleship *Courbet* has been given to the Société de Construction des Batignolles. The *Courbet* and the *Jean Bart* are the two first battleships of the new naval programme, and were laid down at Lorient in August last year.

Permission to Officers to Write.—Permission having been granted to officers of the French Army to write to the papers and publish articles under their own names, M. de Kerguezec, Deputy for the Côtes du Nord, has asked the Minister of Marine to extend this privilege to naval officers also. In reply, the Minister of Marine says that the matter has been under his consideration, and he has decided to grant a like indulgence to the personnel of the Navy, and an order on the subject will shortly be issued.

Reduction of the Rochefort Torpedo Flotilla.—The Rochefort Torpedo Flotilla of the mobile defence has been reduced in accordance with the provisions of the 1910 Budget, and instead of—

- 1 Aviso-Torpedo Vessel in commission;
- 2 Destroyers in commission;
- 1 Sea-going Torpedo Boat in commission;
- 4 First-class Torpedo Boats in commission;
- 8 Torpedo Boats with reduced crews;
- 7 Torpedo Boats in reserve;

it will now consist of:—

- 2 Destroyers in commission;
- 4 First-class Torpedo Boats in commission;
- 4 Torpedo Boats, with reduced crews;
- 4 Torpedo Boats in reserve;

that is a total of 14 vessels instead of 25.

The personnel will also undergo a corresponding reduction from 20 officers and 516 men to 14 officers and 351 men, the total annual cost being reduced from £39,005 to £13,373. Torpedo boats "334," "335," and "336," have left Rochefort for Brest, and the destroyer *Epicure* and torpedo boats "184" and "189," are to proceed to Cherbourg.

Increasing the Habitability of Torpedo Boats.—Following on a report received by the Minister of Marine from the Vice-Admiral Inspector-General, it has been decided to improve the habitability of all first-class torpedo boats, providing better positions for the men's hammocks, cupboards and lockers, movable tables, and other conveniences.

France.

The New Programme.—The *Temps* states that the moderate nature of the new programme submitted to Parliament in February last did not at first meet with general approval, but of late there has been a change in opinion, and numerous important adhesions have been given to the plans of the Minister of Marine. The idea is now generally held that it is wiser to limit ambition to what is immediately practicable and realisable rather than to attempt the construction of a vast fleet. The *Ligue Maritime Française*, which up to recently has not altogether approved of Admiral de Lapeyrère's plans, has issued the following statement:—

"The *Ligue Maritime Française* expresses the wish that the realisation of the naval programme presented by the Minister of Marine may be pushed forward as rapidly as possible, and in particular the constructions necessary to complete the First Squadron to a strength of six battleships and one in reserve, two of which are already under construction in the Arsenal."

The Loss of the "Pluviôse."—The *moniteur de la Flotte*, in a recent article on the salving of the *Pluviôse*, says that it is now certain that there was an outbreak of fire on board at the moment or immediately before the collision. Short circuits were found in the electrical wires in several places, and in the central post all the wires were fused. The wooden tablets calcined, and the ebonite of the switches split or twisted; by the rapid inflow of the water, however, the fire must have been soon extinguished; considerable heat, nevertheless, had been developed, and the question arises whether the crew were not probably asphyxiated rather than drowned. All the different operations for saving the vessel were found to have been carried out, freeing the leaden ballast, disconnecting the motors and diving rudders, and the periscope was turned towards the stern, showing that the officer in command must have been following the movements of the *Pas de Calais*. Lieutenant Callot was found lying doubled up under his periscope, and, like the rest of his crew in the central post, was probably asphyxiated. It is possible that the fire took place before the collision, and that at the time of the collision the vessel was not under control. The fact that everything had been done to save her increases this presumption, for considering the dimensions of the two holes caused by the collision, it is evident that the influx of water must have been too rapid to allow of all the operations for saving the vessel being carried out afterwards.

The two old battleships *Kurfürst Friedrich Wilhelm* and *Weissenburg*, sold to the Turkish Government, have been struck off the list of the Navy. They were handed over by Rear-Admiral Koeh to Commodore Ramiz Bey on the 1st September; on the way out to the Dardanelles an average speed of 12½ knots was maintained, and on a forced draught trial, before the Turks took them over, a mean speed of something over 16 knots was made by those ships.

Steam Trials.—The new first-class armoured cruiser *Von der Tann* was commissioned on the 1st September for her trials; it has since been officially reported that at her full speed trial in deep water off Neukrug

Germany.

a mean speed of 27·4 knots was maintained, the highest speed recorded being 28·124 knots, while the engines developed the enormous shaft horse-power of 80,000.

The new second-class cruiser *Kolberg* averaged 26·3 knots on her full speed trial, her turbine engines made by the Schichau firm developing 27,442 shaft horse-power, and the new destroyer "S 176," during a three hours' full speed trial, made a mean speed of 33·06 knots.

New Ships.—On the 30th June, from the Schichau Yard at Danzig, was launched the *Ersatz Frithjof*, the eighth German battleship of the *Dreadnought* type, which received the name of *Oldenburg*, the launching ceremony being performed by Princess Eitel Frederick of Prussia, a daughter of the Grand Duke of Oldenburg, who delivered the customary address. She is the fourth ship of the second group of German *Dreadnought* battleships, the other three being the *Ostfriesland*, *Helgoland* and *Thüringen*, all launched last year, and which are to be ready for sea next year. The *Oldenburg* is the battleship of the 1909 programme, whose early commencement gave rise to much comment last year, and she is not due for delivery until April, 1912; but there can be no doubt that if the authorities wish, she can be completed at an appreciably earlier date.

Although there are no official details of these ships, it is credibly believed that their dimensions are as follows:—Length, 492 feet; beam, 91 feet; draught, about 29 feet 6 inches with a displacement of some 20,000 tons. The triple expansion engines, of which there are three sets, are expected to develop 25,000-I.H.P., to give a speed of 21 knots. The armament will consist, so it is reported, of twelve 12-inch guns, fourteen 6-inch Q.F. guns, and twenty 20-pounders.

There remain still on the stocks the *Ersatz Hildebrand* and the *Ersatz Heimdall*, both of last year's programme, which are to be completed in 1912, and the *Ersatz Hagen*, *Ersatz Odin*, and the *Ersatz Ægir*, of this year's programme. There seems to be some doubt whether these three last ships have yet actually been laid down; but even if, for any reason, they have not yet been commenced, there is no reason whatever for supposing that they will not be completed by the date fixed, and that is in the early part of the summer of 1913.—*Marine Rundschau* and *Revue Maritime*.

Cost of the Fleet.—The cost of the Fleet in commission is distributed as follows:—

1. *The High-Sea Fleet.*

		1910.		1909.	
		Marks.	£ s.	£ s.	
Active Formation	...	11,693,420	(584,671 0)	576,756 10	
16 Battleships.	...				
Reserve Formation	...	1,426,630	(71,331 10)	56,727 0	
2 Battleships.	...				
Scouting Ships	...	6,050,430	(302,521 10)	299,540 10	
4 Large Cruisers.	...				
6 Small Cruisers.	...				
Tender.	...				
Torpedo-Vessels	...	6,266,662	(313,333 2)	235,679 15	
Submarines	...	498,910	(24,945 10)	—	
Total	...	25,936,052	(1,296,802 12)	1,168,703 15	

Showing an increase of 2,561,977 marks (£128,098 17s.) as compared with last year.

Germany.

2. *Ships on Foreign Service.*

	1910.	1909.
	Marks.	£ s. d.
The East Asian Station	4,416,840	(220,842 0) 189,143 18
1 Large Cruiser.		
3 Small Cruisers.		
4 Gunboats.		
2 Torpedo Boats.		
4 River Gunboats.		
1 Special Service Steamer.		
The Australian Station	666,260	(33,313 0) 16,866 0
2 Small Cruisers.		
The West African Station	458,220	(22,911 0) 20,487 0
2 Gunboats.		
The East African Station	530,780	(26,539 0) 26,706 0
2 Small Cruisers.		
The American Station	484,560	(4,182 0) 25,242 0
1 Small Cruiser.		
Constantinople	83,640	(8,658 0) 4,625 0
1 Stationaire.		
Surveying Duties	173,160	(24,228 0) 8,094 0
1 Surveying Ship.		
Total	6,813,460	(340,673 0) 291,163 18

Showing an increase of 990,182 marks (£49,509 2s.) as compared with last year.

3. *Training Ships.*

Cadets' and Boys' Training Ships	3,193,020	(159,651 0) 154,590 0
Gunnery School Ships	2,374,030	(118,701 10) 89,485 7
Torpedo School Ships	1,697,860	(84,893 0) 72,982 10
Submarine Mining	724,710	(36,235 10) 33,053 0
Coast Pilotage	61,340	(3,067 0) 3,087 0
Total	8,050,960	(402,548 0) 353,197 17

Showing an increase of 986,993 marks (£49,349 3s.) as compared with last year.

4. *Special Service Ships.*

Imperial Yacht "Hohenzollern"	385,890	(19,794 10) 20,151 0
Surveying Ships (Home Waters)	70,810	(3,540 10) 3,504 0
Artillery Experiments	657,420	(32,871 0) 32,066 16
Torpedo Experimental Ship	951,360	(47,568 0) 45,780 0
General Experiments	217,920	(10,896 0) 11,268 10
Fishery Protection	181,280	(9,064 0) 7,387 10
Total	2,464,680	(123,234 0) 120,147 16

Showing an increase of 61,724 marks (£3,086 4s.).

5. *For Special Purposes* 860,240 (43,012 0) 49,605 15

Showing a decrease of 131,875 marks (£6,593 15s.).

COMBINED TOTAL.

High Sea Fleet	25,936,052	(1,296,802 12) 1,168,703 15
Foreign Service	6,813,460	(340,673 0) 291,163 18
Training Ships	8,050,960	(402,548 0) 353,198 7
Special Service Ships	2,464,680	(123,234 0) 120,147 16
Special Purposes	860,240	(43,012 0) 49,605 15
Total	44,125,392	(2,206,269 12) 1,982,819 11

Showing an increase of 4,469,001 marks (£223,450 1s.) as compared with last year.

—Etat für die Verwaltung der Kaiserlichen Marine, 1910.

The reassignment of vessels of the Atlantic Fleet was to take effect immediately after their visit to the yards in May and June. This visit will be the last occasion on which the fleet, as a whole, will be dispersed to their home yards, except for periodic docking. Vessels requiring repairs beyond the capacity of their crews will thereafter visit the yards in accordance with the plan outlined in the printed schedule, i.e., the vessels of a division will go to the divisional home yard one at a time, the order of rotation depending upon the relative condition of the vessels.

In July, 1911, when the *Florida* and *Utah* are completed, and when the *New Jersey*, *Maine*, *Missouri* and *Ohio* will have been overhauled, the Atlantic fleet will be increased to 21 battleships in full commission. It will then be practicable to keep 17 battleships actively employed, the remaining 4 being at home yards for such repairs and overhauling as may be required.

Some of the benefits, which it is expected will be gained by the adoption of the new regulations, are set forth in the following schedule, but the most important of all are the certainty that the operations of the fleet will not be interrupted by the necessity for navy-yard repairs, the regulation of the work on ships at navy yards to give a practically constant amount throughout the year and the increased strength and efficiency of the active fleet due to keeping a large number of battleships employed with greatly increased opportunity for manœuvres and exercises.

1. The Atlantic fleet will, in July, 1911, comprise 21 battleships, 4 armoured cruisers, and auxiliaries.

2. The commander-in-chief will fly his flag in a ship independent of any division.

3. Each battleship division will have five ships, four of which will always be ready for active service, while the fifth will be at the division home port for necessary overhauling and repairs.

4. The fleet as a whole will visit the navy yards twice each year for docking only.

5. The ships of a division will visit its home yard in rotation, the order of rotation depending upon the relative condition of the ships. Thus each yard will usually have one battleship under repair, which will result in a practically uniform distribution of work throughout the year.

6. By recent changes in the Navy Regulations, division commanders are charged with the administration of their divisions, subject to the authority and supervision of the commander-in-chief. When divisions go to their home yards for docking, or for any other reason, a division commander will have all his ships under his supervision, and not dispersed among several yards, as is now the case.

7. Ships are assigned to divisions on the following considerations:—

- a. The most powerful and fastest ships should be in the van.
- b. A division should be homogeneous.
- c. The heaviest ships should be based at New York or Norfolk, owing to the superior docking facilities at those yards.

United States.

- d. Assignments should be so made as to require the fewest possible reassignments later when new ships are added to the fleet.
- e. The commander-in-chief's flagship and all fleet auxiliaries should be based at New York, owing to its central location and superior advantages as a supply base.
8. The four battleship divisions are assigned to the four most important yards, viz., New York, Norfolk, Philadelphia and Boston. To give the Portsmouth yard its due share of work the Armoured Cruiser Division is based there.
9. The Reserve fleet will be organized as soon as the vessels available for it shall have completed their overhauling. The *Iowa*, *Indiana* and *Massachusetts* will be ready to form the nucleus of this fleet after the Naval Academy practice cruise in 1910. The *Wisconsin* and *Kearsarge* classes will be added as soon as overhauled.
10. The overhauling of the *New Jersey*, *Maine*, *Missouri* and *Ohio* will be completed at the earliest practicable date, but not later than 1st July, 1911, in order that 21 battleships may be available for the Atlantic fleet.
11. It is not contemplated that battleships will be placed out of commission in future for overhauling, but that they will be overhauled and repaired by their own crews, at their home ports, assisted by the yards.
12. By allowing each ship of the fleet an uninterrupted period of two or three months each year for overhauling and repairs, and by requiring the crews at all times to keep up current repairs and not permitting them to accumulate, it is expected that ships will not deteriorate to such an extent as to require a general overhauling, as in the past. The schedule of operations of the fleet will hereafter be formulated with a view to giving requisite opportunities throughout the year for frequent overhauling and repairs.
13. A battleship placed in reserve should be given at least a third of its full crew and as nearly a full complement as the conditions of the navy personnel will permit. By 1911 it is expected that battleships in reserve may be given crews of at least 350 men each. These crews would be expected to keep the ships in efficient condition and ready for immediate service, say, on 24 hours' notice. By combining two or three reserve crews in one ship it is expected that reserve ships will be able to go to sea for exercises and target practice.
14. It is expected, also, that vessels of the Reserve fleet will be available for Naval Academy practice cruises and for drilling State naval militia.
15. The Reserve fleet will be based at Philadelphia because of the advantages offered by the fresh-water basin at that place.
16. The most effective of the destroyers and submarines will be kept in commission, based at New York, Boston and Norfolk, as indicated on the plan. Torpedo vessels in reserve will be based at Charleston, as at present.
17. With the exception of six or seven gunboats, necessary for police work and surveying, vessels of little or no military value will be placed out of commission as soon as practicable.

United States.

18. Colliers, monitors, station ships, and others of lesser importance, are omitted from this plan for the sake of brevity and for the reason that they do not materially affect the proposed scheme.

The reassignment of ships to home yards, effective 1st July, 1910, is as follows:—

Atlantic Fleet.—*Connecticut*, *Delaware*, *North Dakota*, *Michigan*, at New York; *Louisiana*, *South Carolina*, *Kansas*, *New Hampshire*, at Norfolk; *Georgia*, *Nebraska*, *Rhode Island*, *Virginia*, at Boston; *Minnesota*, *Vermont*, *Mississippi*, *Idaho*, at Philadelphia.

Battleships in Reserve or Out of Commission.—*New Jersey*, at Boston; *Maine*, *Missouri*, *Ohio*, *Wisconsin*, *Illinois*, *Alabama*, *Kearsarge*, *Kentucky*, no reassignment until after completion of overhauling; *Iowa*, *Massachusetts* and *Indiana*, at Philadelphia.

Special Service Squadron.—*Tennessee*, *Washington*, *North Carolina*, *Montana*, at Portsmouth.

Scouts.—*Chester*, *Salem*, *Birmingham*, at Boston.

Atlantic Fleet Auxiliaries.—*Celtic*, *Culgoa*, *Panther*, *Solace*, *Yankton*, at New York.

Cruisers and Gunboats.—*Des Moines*, at Boston; *Tacoma*, at New York; *Dubuque*, *Paducah*, *Marietta*, at Portsmouth; *Montgomery*, at Philadelphia; *Scorpion*, at Boston; *Eagle*, *Hist*, at Portsmouth; *Mayflower*, *Dolphin*, at New York; *Sylph*, at Washington; *Prairie*, at Philadelphia.

Atlantic Torpedo Fleet.—*Dixie* (tender), *Smith*, *Flusser*, *Lamson*, *Preston*, *Reid*, at Norfolk.

Torpedo Vessels in Reserve.—At Charleston.

Submarines.—At Boston and Norfolk.

Submarines in Reserve.—At New York.

The assignment in July, 1911, is as follows:—

Atlantic Fleet.—*Connecticut* (C. in C.), *Florida*, *Utah*, *Delaware*, *North Dakota*, *Michigan*, at New York; *Louisiana*, *South Carolina*, *Kansas*, *Vermont*, *New Hampshire*, at Norfolk; *Georgia*, *Nebraska*, *New Jersey*, *Virginia*, *Ohio*, at Boston; *Minnesota*, *Mississippi*, *Idaho*, *Maine*, *Missouri*, at Philadelphia; *Tennessee*, *Washington*, *North Carolina*, *Montana*, at Portsmouth.

In Reserve.—*Rhode Island*, at Boston; *Iowa*, *Massachusetts*, *Indiana*, at Philadelphia.

Note.—*Rhode Island* overhauling.

Out of Commission.—Overhauling.—*Wisconsin*, *Illinois*, *Alabama*, *Kearsarge*, *Kentucky*, at Philadelphia.

Note.—These vessels overhauling for reserve fleet.

Scouts.—At Boston.

Atlantic Fleet Auxiliaries.—At New York.

Gunboats for Police and Surveying.—At Portsmouth, except *Scorpion*, at Boston.

Atlantic Torpedo Fleet.—*Dixie* (tender), at New York; *Smith*, *Flusser*, *Lamson*, *Preston*, *Reid*, at Norfolk; *Paulding*, *Drayton*, *Roe*, *Terry*, *McCall*, *Perkins*, *Sterrett*, *Burrows*, *Warrington*, *Mayrant*, at New York; *Ammen*, *Trippe*, *Walke*, *Monaghan*, *Patterson*, at Boston.

United States.

All reserve torpedo vessels at Charleston, except *Morris* and *McKee*, at New York.

Submarines at New York, Boston and Norfolk; torpedo training ship at Boston; yachts *Mayflower* and *Dolphin*, at New York, and *Sylph*, at Washington.

The assignment in April, 1912, is as follows:—

Atlantic Fleet.—*Wyoming* (C. in C.), at New York; *Arkansas*, *Florida*, *Utah*, *Delaware*, *North Dakota*, at New York; *Louisiana*, *Michigan*, *South Carolina*, *Vermont*, *New Hampshire*, at Norfolk; *Connecticut*, *Kansas*, *Minnesota*, *Idaho*, *Mississippi*, at Philadelphia; *Georgia*, *Nebraska*, *New Jersey*, *Rhode Island*, *Virginia*, at Boston; *Tennessee*, *Washington*, *North Carolina*, *Montana*, at Portsmouth.

Reserve Fleet.—*Missouri*, *Ohio*, *Maine*, *Wisconsin*, *Illinois*, *Alabama*, *Kearsarge*, *Kentucky*, *Iowa*, *Massachusetts*, *Indiana*, at Philadelphia.

Note.—*Maine*, *Missouri*, and *Ohio* available to replace vessels of Atlantic fleet that must overhaul extensively.

Scouts at Boston; and Atlantic fleet auxiliaries at New York.

Gunboats and torpedo vessels practically the same as in preceding year, with few additions of destroyers and submarines.—*Proceedings of the United States Naval Institute.*

MILITARY NOTES.

THE KING.

Honorary Distinctions.—His Majesty the King has been graciously pleased to approve of the honorary distinctions which have been awarded to, and are now borne on the colours or appointments of the regular battalions of each regiment of the Infantry of the Line, being borne on the colours or appointments of the Special Reserve battalion or battalions belonging to these regiments.

The battle honours at present borne by Special Reserve battalions (awarded when Militia units) will, in consequence, lapse.

Home

The following are the principal appointments which have been made:—

Lieut.-General—Sir William H. Mackinnon, K.C.B., C.V.O., to be General Officer Commanding-in-Chief, Western Command. Major-General—John S. Cowans, M.V.O., to be Director-General Territorial Force. Colonels—William Fry, C.V.O., C.B., to be Deputy Director-General of the Territorial Force (temporarily), with temporary rank as Brigadier-General; Hon. Cecil E. Bingham to command 2nd Cavalry Brigade, Eastern Command, with temporary rank as Brigadier-General; Henry S. Horne to be Staff Officer for Royal Horse and Field Artillery, Aldershot Command; Edmund R. O. Ludlow to be Assistant-Quartermaster-General, Northern Command.

Territorial Force.—Major-General Cecil W. Park, C.B., to command East Lancashire Division, Western Command.

Staffs and Troops of the XVth and XVIth Army Corps.—
Austria-Hungary.

1. *Change of Station of the Headquarters of the XVIth Army Corps.*—On the 30th September, the Headquarters of the XVIth Army Corps were transferred from Zara, where it had been provisionally stationed since the creation of the Corps, to Ragusa, where it will be more within reach of the principal garrisons and important strategic points of the region.

2. *Change of Station of Staffs.*—In the course of last summer the Staff of the 4th Mountain Brigade was transferred from Cattaro to Ragusa, and that of the 14th Mountain Brigade from Castelnuovo to Cattaro. According to report the Staff of the 47th Division will be transferred from Cattaro to Castelnuovo.

This series of changes has for its effect to group in a more logical fashion the forces in Dalmatia, which, since the annexation, have been increased by 1 battalion, 10 machine gun detachments, 5 mountain batteries, and 4 squadrons of mountain train.

3. *Appointment of Field Officers to the Staffs of the Mountain Brigade.*—A field officer (Colonel) is to be appointed to the Staff of each of the 14 Mountain Brigades of the XVth and XVIth Corps, so that the General of Brigade will have at his disposal, should occasion arise, an officer who can be employed on special duties and which will allow of the eventual division of each brigade into two, if advisable.

4. *Battalion Detached from the 15th and 16th Regions.*—The troops of the XVth and XVIth Corps provide, for the most part, the garrisons in the interior of the Monarchy. These detached units have enjoyed a certain independence. It is thus that, in many matters (promotion, honours, etc.), the commandants of infantry battalions have the powers of the head of the regiment. For the future this independence will be still greater in the sense that the battalions will have their own administration.

In addition to this, their effective strength in men and officers will be increased. Every year, the Common Minister of War will allot to them an extra number of recruits. In regard to the officers, their number will be per battalion for the future, 1 to 2 field officers, 6 captains, 11 to 12 subaltern officers, with 2 cadets.

The relief of the battalions, which has taken place generally every four years, will not be made so often. The relief of officers will take place periodically, under the supervision of the Common Minister of War, it being understood that they serve at least three years in the annexed countries.—*Revue Militaire des Armées Étrangères.*

New Austrian Landwehr Mountain Regiment.—By an Imperial Decree of the 5th July of this year, the Emperor has decided that the Landwehr regiment of infantry, No. 27 (Laibach), will be transformed on the 1st March, 1911, into a mountain regiment, and that the 2nd Battalion of the Landwehr Infantry Regiment No. 4 (Klagenfurt) will be detached from that regiment and be attached to the Regiment No. 27.

In consequence of this decision, the *Verordnungsblatt* of the 21st September gives the new organic dispositions relative to the Austrian Landwehr.

Austria-Hungary.

The foot troops of the Austrian *Landwehr* are composed of 37 regiments of infantry and of 3 regiments of Rifles, which are distinguished by a number and the name of the garrison where the staff of the regiment is quartered. The infantry regiments are numbered from 1 to 37, and the Rifle regiments Nos. I., II., and III.

The infantry regiments 1 to 3, 5 to 26, 28 to 37, consist of a regimental staff, of three battalions (except the Regiment No. 23, which has only two), and of a Depôt Battalion Cadre. Each battalion has four companies and a detachment of two machine guns, which bear the number of the battalion.

The Infantry Regiment No. 4 (Klagenfurt) and No. 27 (Laibach), as well as the Rifle Regiments I. (Trente), II. (Bozen), and III. (Innichen), form the mountain troops of the Austrian *Landwehr*. Each regiment consists, in time of peace, of the staff of the regiment, of the Depôt Battalion Cadre, and, in addition:—

The Regiment No. 4 (Klagenfurt), of one battalion of five and of one battalion of four companies;

The Regiment No. 27 (Laibach) of three battalions, one of which has four and the other two three companies;

The Rifle Regiment No. I. (Trente) of three battalions of four companies;

The Rifle Regiment No. II. (Bozen) of three battalions, of which one has four and the other two, three companies;

The Rifle Regiment No. III. (Innichen) of four battalions, of which two have two and two three companies.

Each battalion is provided with a detachment of four machine guns.

The total strength of the *Landwehr* infantry is: 119 active battalions with 467 companies, 119 machine gun detachments, and 40 Depôt Battalion Cadres. The peace effective of the companies of the line is 4 officers, 1 cadet on probation, and 60 non-commissioned officers and men; that of the mountain companies is 4 officers, 1 cadet on probation, 104 non-commissioned officers and men, and 4 bât animals.

The 2-gun infantry machine gun detachments have in peace 1 officer, 14 men, and 5 bât animals; and the 4-gun detachments, 3 officers, 52 men, and 16 bât animals.

The *Landwehr* cavalry consists of 6 Uhlan Regiments, 1 division of Tyrolean Mounted Carabineers, and 1 division of Dalmatian Mounted Carabineers. The Uhlan Regiments consist of 2 divisions of 3 squadrons, with a Pioneer section, a telegraph patrol, and a Depôt Cadre; the division of Tyrolean Mounted Carabineers comprise 3 squadrons, 1 telegraph patrol, and 1 Depôt Cadre, while the Dalmatian Mounted Carabineer Division comprises 2 squadrons, 1 telegraph patrol, and 1 Depôt Cadre. The squadrons have a peace effective of 6 officers and cadets on probation, 85 non-commissioned officers and men, 6 officers' horses, and 72 other horses.

The artillery consists of 8 groups of field howitzers, two 4-gun (104-mm.) batteries, with 1 ammunition park cadre, and 1 depôt group per cadre. The peace effective of the battery is 4 officers, 1 cadet, 99 men and 50 horses.—*Revue Militaire des Armées Etrangères* and *Bulletin de la Presse et de la Bibliographie Militaires*.

Austria-Hungary.

The Engineer Officers' Corps.—The special Corps charged with military constructions other than fortifications (*Militär-Baubehörden*) include the engineers as well as the *employés* charged with the superintendence of the works and of the accounts.

Up to the present the engineers of military constructions formed a special group of officials (*Militär-Bauingenieure*), who were recruited among the officers or the superintendents who had followed the special courses of the Superior Technical School at Vienna. But they were not assimilated to nor did they have the rank of officer. These two favours are to be accorded to them by the transformation of the said group into a Corps of Officer Engineers (*Ingenieuroffiziers Korps*). A Decree of the 29th August of this year lays down the organic dispositions.

The Corps in question is charged with the duty:—

1. Of directing and providing for the service of constructions other than fortifications, in time of peace and in time of war;
2. In time of war, of eventually constructing fortification works, under the superintendence of the Headquarter Staff of the Engineers.

As particularly belonging to its province are:—

1. The planning, execution and maintenance of military buildings;
2. The acquisition of ground intended for military uses and of exercise grounds;
3. The adaptation of the service to the progress of modern science.

The Corps will consist:—

1. Of officers having at least the rank of captain, and forming a special group for promotion (*Konkretualstand*);
2. Of lieutenants attached to the Corps.

At its head will be a general, who will bear the title of "Chief of the Corps of Officer Engineers." This general officer is an Auxiliary Agent of the Common Minister of War, with whom he communicates directly.

The Corps is recruited among the officers who have passed the final examination of the course for Officer Engineers, for which every lieutenant who has at least four years' seniority as officer and is under thirty years of age, can enter. The admission of officers into the Corps of Engineers is left to the discretion of the general, the head of the Corps.

The peace effective of the new Corps is fixed at:—

- 1 Lieutenant-General, Chief of the Corps;
- 2 Generals of Brigade (Major-Generals);
- 14 Colonels;
- 16 Lieut.-Colonels;
- 22 Majors;
- 75 Captains;
- 23 Lieutenants (attached).

—*Revue Militaire des Armées Etrangères.*

Austria-Hungary.

New Heavy Field Howitzer.—The announcement is made that a new 15-cm. (6-inch) heavy howitzer will shortly be adopted.

The heavy howitzer at present in use is drawn by six horses; it can only move slowly over good ground and not at all over ground that is bad. The new howitzer, on the contrary, can be dismounted and transported apart from its mounting, there being two carriages, the one for use in transport or on the march, the other for firing. In order to render the transport easy, no matter what the nature of the ground may be, the system which the French have adopted for their 15-cm. howitzer has been chosen, where the gun and firing mounting are transported separately. On the march the gun is placed on the transport carriage and the firing mounting follows; it is only when the time has come for the gun to come into action that it is mounted on the latter.

Each of these two parts of the gun is drawn by six light-draught horses, like those of the field artillery; the limbers of the two mountings carry the ammunition. This method of transporting the howitzer, which belongs to the heavy artillery of the army, apart from the mounting, permits of its following the troops everywhere, even when the pace is rapid.—*Bulletin de la Presse et de la Bibliographie Militaires.*

Belgium. *Military Aerostation.*—A. The new dirigible *Belgique III.*, presented to the King by its owners, MM. Goldschmidt and Solvay, has been placed by His Majesty at the disposal of the Minister of War, and the Belgian Army thus acquires its first dirigible.

The new dirigible differs from the first models, the *Belgique I.* and *II.*, in the following modifications, which have been rendered necessary as the result of the numerous trials carried out in the course of last year:—

1. The long lower keel, which constituted one of the principal characteristics of the first balloon, has been suppressed, and has been replaced by a triangular car 72 feet long. The balloon itself is thus completely supple, in place of being semi-rigid;
2. The capacity has been increased to 141,266 cubic feet from 98,886 cubic feet.
3. The motors, in place of being separated, only form one group of 110-H.P., independent, however, the one of the other, and able to either work together or separately.
4. In place of two screws, the *Belgique III.* possesses three: one tractive, forward; two propelling, behind. These last can be disconnected for slow voyaging.

The length of the dirigible remains the same, that is 219 feet. With four passengers, it disposes of 1 ton 9½ cwt. of ballast.

B. A second military dirigible, the *Bruzelles*, arrived at Brussels by railway at the beginning of October. Constructed at Issy, it has a capacity of 273,196 cubic feet, is 255 feet in length, is provided with two motors of 100-H.P. each, and three independent screws.

The hangar, built on the manœuvre field at Etterbeck, with the view of sheltering the new dirigible, was inaugurated on the 23rd of last January.

Belgium.

C. Finally, a third dirigible is under construction under the superintendence of the Military Authorities. The plans for this dirigible were drawn out by Captain Le Clément de Saint-Marco, commandant of the balloon company.

The Minister of War has decided to acquire a bi-plane, probably of the Farman type. He will next purchase a mono-plane. Two officers have been detailed for instruction in the management of aeroplanes.—*Revue Militaire des Armées Étrangères.*

*The Army Estimates for 1910 (Précis), continued.—***France.***French and German Contingents.*

Taking as his basis the contingent for 1907, and the decisions taken in regard to the *ajournés*¹ of that contingent during the following years, M. Waddington, the Reporter of the Budget for the Senate, establishes that the distribution of the whole of the *Inscrits*, excluding the long-service men, is as follows:—

France.

Incorporated in the Active Army -	-	-	77.6 per cent.
Incorporated in the Auxiliary Service -	-	-	6.4 " "
Exempted from all Service -	-	-	16.0 " "

Germany.

Incorporated in the Active Army -	-	-	54.7 per cent.
Allotted to the Recruiting Reserve -	-	-	16.6 " "
Allotted to the <i>Landsturm</i> , 1st Ban -	-	-	23.0 " "
Unfit for Service -	-	-	6.6 " "

It appears from the above table that while France incorporates 84 per cent. of the men called up, Germany only incorporates 54.7 per cent., and as the result of this large incorporation the number of men compulsorily retired as physically unfit is high, as much as 6 per cent. in the first year, although in the second year this proportion descends to something over 2 per cent.

Sick Rate and Mortality.

The following table gives the proportion per thousand men of the effective strength, of the sick rate and mortality in the different European Armies:—

	Sick rate.	Death rate.
1906 Russia -	415.9	3.13
1907 Belgium -	416.6	2.08
1907 Great Britain -	438	3.14
1905 Bavaria -	504.3	2.4
1907 Germany -	601.5	2
1904 Italy -	711	3.50
1908 France (Home) -	756	4.05
1907 Austria -	826.5	2.71
1906 Spain -	1036.9	4.57

¹ The *ajournés* are the young men to whom a delay of one or two years is granted for various reasons before they are required to join the Colours.

France.

Long Service Engagements and Re-engagements.

The falling off in the effectives, in consequence of the Law of 21 March, 1905, has been partly made up by the incorporation of the men of the Auxiliary service, who formerly only came back on mobilisation to take up certain duties, principally in the services at the rear. But in order to raise to as high a point as possible the organic effectives in men of the Active Army, it has become necessary in France to make a call for a greater number of long service and re-engaged men than was required under the old three years' service system.

The necessity of inducing men to serve beyond the legal time, and of keeping them, applies particularly to the cavalry, so as not to draw upon the reserves of mobilisable cavalymen and, in all the mounted branches, so as to ensure the working of certain services which require the constant practice in and special knowledge of the duty required. As a matter of fact, the cavalry requires for its different services the instruction of a large number of specialists, who cannot be trained under a two-years' system. Further, these long service and re-engaged men are also indispensable for the recruiting of the cadres and of good instructors.

In order to keep with the colours men of this category, certain civil employments are now, under the new regulations, open to them and higher pay and fixed bonuses are granted them.

The Preparatory Schools and the School of Saint Cyr.

The preparatory Military Schools—four for the infantry, one for the cavalry, and one for the artillery and engineers—are intended to prepare capable under-officers. There are admitted to these schools, between the age of 13 and 14 the sons of soldiers who have re-engaged, the sons of officers up to the rank of captain, and the sons of deceased field-officers. The young men are kept at these schools up to the age of 18, and those who then refuse to sign an engagement to serve in the army have to repay half the cost of their maintenance, that is 300 francs per year for five years.

The Prytanée (the preparatory Military School) of La Flèche only receives the sons of officers, who are holders of scholarships and half-scholarships, or as boarders. The pupils are specially prepared for admission to St. Cyr, to the Naval School, the School for the Army Medical Service, and the Veterinary Schools.

The suppression of these different schools, with compensation for the scholarships, which had been admitted in principle by Parliament before the Recruiting Law of 1905 was voted, has been again made the object of an amendment, which, however, has been rejected by the Minister of War as inopportune, as he had come to an agreement with the Minister of Public Instruction with regard to the compensations and gratuities to be paid for the day and boarding-schools for the sons of military men.

In all that concerns particularly the Military Prytanée of La Flèche, from which, since its foundation in 1815, more than 300 generals have come, while more than 61 per cent. of its pupils have become officers, the maintenance of this establishment is necessary in order to remedy the

France.

inconveniences which would result to the boys from the frequent changing of the garrison of their fathers.

The Minister of War is of opinion that the reorganisation of these different schools is required rather than their suppression. He has announced that a programme is under consideration which will give the pupils, not only general but professional instruction, and allow of their finding openings in civil careers when they do not wish to embrace a military one. Several deputies have also insisted on the reestablishment at the Prytanée of preparation for the Polytechnic School which had been given up for some years.

As regards the School of St. Cyr, where the pupils pay at the present time 1,300 francs a year, a protest has been made against the gratuity granted to this establishment, as the consequence of the Law of 1905, which imposes a year's regimental service before admission to the school. This proposal has not been agreed to, General Brun (the Minister of War) having remarked that scholarships are bestowed on almost all those who apply for them. They are only refused to young men who belong to well-to-do families. Attention was also drawn by Deputies to the disadvantages of the present mode of selection of the pupils for the cavalry section, which is according to the order of classification at the entrance examination, without any account being taken as to whether they possess the qualities required for this arm of the service.

It may be as well to note that the preliminary one year's service in a regiment now required has had the effect of reducing the number of candidates from 1,543 in 1903 to 803 in 1909, and 800 in 1910.

The Artillery.

The reorganisation of the artillery entails an annual and permanent expenditure of £610,680, and an original outlay of £2,362,600, about half of which has been allotted to the manufacture of ammunition for the 75 mm. gun (£1,122,000).

According to statements made in the Senate on the 31st of last March by General Langlois, the Horse Artillery batteries, which for some years have kept the old 80 mm. gun, have been armed with the gun of the field batteries, lightened by doing away with the shields. The model of the cavalry gun, put forward by Colonel Deport, the inventor of the 75 mm. gun, has been rejected after trials, and, according to General Langlois, for a defect which only required simple focussing. "The result is," he states, "that the French cavalry is at present supported by a gun which is too heavy and which is not protected by a shield; it is consequently in an unfavourable condition for a struggle with an adversary protected by shields."

A new credit of £522,400 figures in the extraordinary expenses (3rd Section) for the manufacture of machine guns and their ammunition. The ordinary expenses for the maintenance of the existing machine guns, the purchase and maintenance of the 688 horses allotted to them, and the instructional ammunition, amount to £112,620.

The machine gun sections, according to whether they belong to the field or fortress groups, receive an allowance of from 10,000 to 6,000 blank and ball cartridges.

France

On the subject of the maintenance of the *matériel* of the field artillery, a note by the War Department inserted in the Report of the Senate gives the following details:—

"In order to avoid incurring useless expense in transport, workmen will be sent to repair on the spot guns which are slightly damaged, without it being necessary to replace them in the batteries.

"For the same reason, the whole gun is not to be sent for repair to the establishment where it may have been constructed, but only the damaged part, such as the gun, properly so-called, or the break, the carriage, limber, the breech block, sight, shield, etc., as the case may be."

According to this note, there were sent in 1909 to the different manufacturing establishments:—

496 guns (mean cost of repair, about £4 16s.);

44 breaks (mean cost of repair, about £24);

462 mountings (mean cost of repair, about £12).

The note points out that in proportion as the *matériel* gets old, a greater number of parts arrive at the worn out stage and have to be replaced. Thus the necessary credit for the maintenance of the *matériel* of the 75 mm. gun is calculated at a mean of £97 12s. per active battery.

General Langlois also pointed out that the Lebel rifle was becoming old, and that it was time for considering the necessity of replacing it. The cost of doing this would be very heavy, amounting probably to from 350 million to 400 million francs.

The Minister of War considers that the models of automatic rifles brought forward up to the present have not realised, from the point of view of their use as a weapon of war, all the superiority which is desirable, and he has laid down a programme of the conditions which a rifle of this kind must satisfy before adoption.—*Bulletin de la Presse et de la Bibliographie Militaires*.

Issue of Alcohol to the Troops during the Operations in Germany. South - West Africa, 1904-1907. — The advisability of issuing alcohol to the German troops in Africa is carefully considered in the official medical report of the Herero uprising, 1904-1907. During the greater part of the campaign a daily allowance of one-tenth litre of rum, cognac or other spirit was issued; at a later period this was replaced by red wine or fruit juice. The arguments in favour of giving alcohol were: Most of the men had been accustomed to take alcohol in some form, and it was thought that if no issue were made they would be inclined to obtain some inferior spirit surreptitiously. Many medical officers held that alcohol taken at night prevented stomach chills and gastro-intestinal disorders, and that it tended to induce sleep, which tea or coffee did not. It helped to make the alkaline water of the country palatable. It has a certain food value, calculated in this case at 300 calories. In the absence of yeast or baking powder it was found useful when baking bread. On the other hand, the following objections were raised: The quantity allowed daily was too great. If drunk at once, under the trying conditions of the campaign, it tended in many cases to make men either sleepy, irritable, insubordinate or lazy.

Germany.

There was great temptation to dispose of it to a comrade, who might thus easily become inebriated. Men who were formerly abstainers acquired a taste for alcohol. When troops were without alcohol there was no appreciable increase in the amount of sickness.—*New York Medical Journal*.

Numbers and Distribution of the Officers of the Reserve and Landwehr of Prussia, Saxony and Württemberg.—

Officers of the Reserve.

	Prussia.	Saxony.	Württemb.
Infantry and Jägers ...	8,821	883	514
Cavalry ...	2,333	235	120
Field Artillery ...	3,451	317	141
Foot Artillery ...	612	21	—
Pioneers and Troops of Communication ...	1,023	32	19
Train ...	887	58	34
Totals ...	17,127	1,546	828

Officers of the Landwehr.

	Prussia.	Saxony.	Württemb.
Infantry and Jägers ...	5,181	603	344
Cavalry ...	804	53	41
Field Artillery ...	1,140	92	75
Foot Artillery ...	211	23	2
Pioneers and Troops of Communication ...	398	39	17
Train ...	371	26	25
Totals ...	8,105	836	504

A comparison with the similar tables for 1909 shows that for the three States in question the number of the officers of the Reserve has increased by 1,163; on the other hand, the number of Landwehr officers has decreased by 45. No details are available for Bavaria, no Army List for 1910 having been published.—*Revue Militaire des Armées Etrangères*.

The New German Medical Organization for a Cavalry Division in the Field.—*Précis* from *Kavalleristische Monatshefte* of March, 1910, of an article by Oberstabsarzt Boehncke.—One of the most important changes introduced into the German Army Medical organization in the field by the new Medical Field Service Regulations of 1907, concerns the medical organization of a cavalry division. A new mobile medical unit, the "Sanitätsstaffel," has been introduced.

Comparison with neighbouring Powers:—

	Germany, 1907.	Austria-Hungary.	France.	Russia.
Ambulance Wagons ...	6	4 (4-horsed)	8	2 (1-horsed)
Medical Supply Wagons ...	1	3	8	8 (2-horsed) 10 (1-horsed)

Germany.

The German Army has introduced a new pattern of ambulance wagon, designed to carry a supply of medical and surgical material, as well as wounded; this has permitted it to cut down the number of medical store wagons to one.

The wagon takes two men sitting beside the driver, and can carry two lying-down patients on stretchers inside the wagon. The roof rests on supports, the space between being closed by waterproof curtains. In a compartment under the floor of the wagon are four zinc-lined boxes and a sliding drawer. These contain medicines, dressings, and medical comforts. In the driver's box there are four water bags, and under the body of the wagon there is a water-barrel. If necessary, other articles, e.g., blankets, waterproof sheets, could be carried in the wagon. The wagon is lightly constructed and very elastic; it can turn on its own ground and has proved itself capable of following cavalry anywhere. With each regiment of the cavalry division there are also two pairs of panniers; these contain a supply of medicines and dressings, and the canvas for four emergency stretchers, troopers' lances being used as poles. Each pair of panniers is carried by a led pack-horse. These are intended to accompany small detached parties or to remain with the pursuing cavalry while the wagons form a dressing station. For the whole cavalry division there is only one 6-horsed wagon for medical stores, this marches with the heavy baggage of the division. This is intended to carry medical and surgical supplies to replenish those of the ambulance wagons; it also carries twelve water bags, twelve emergency stretchers, three cooking apparatuses, and the materials for two hospital tents.

The number of regimental bearers is not fixed, as many men as are required will be taken from the ranks (a certain number are specially trained as bearers). The author thinks that there will be some difficulty in obtaining men, as Officers Commanding will object to anyone leaving the ranks till fighting is finished, and a certain number of the trained bearers will probably be wounded themselves.

The medical organization of a cavalry division is now as follows:—

Personnel.—1 A.M.O. with a mounted non-commissioned officer of the bearer company; 18 medical officers (3 per regiment); 36 men of the medical troops (6 per regiment); 12 mounted orderlies (2 per regiment), each leading a pack-horse. Regimental bearers (number not fixed).

Matériel, in addition to that carried by medical officers and orderlies:—

12 pairs of panniers on pack-horses, with 24 emergency stretchers.

6 two-horsed ambulance wagons, each carrying two stretchers, medical and surgical supplies and medical comforts.

1 six-horsed store wagon with reserve supplies and tents; this remains with the heavy baggage of the division.

To the above must be added the *personnel* of the horse artillery brigade, viz.:—2 medical officers, 2 mounted medical corps men; 1 non-commissioned officer of medical corps, not mounted, who accompanies the

Germany.

light ammunition column; regimental bearers taken as required. Their matériel is:—

2 field medical companies.

2 field medical boxes, infantry pattern.

2 folding stretchers.

When an engagement is imminent, two-thirds of the medical personnel and equipment, with the exception of the pack-horse panniers, is taken to form a "Sanitätsstaffel," i.e., dressing station, or, if necessary, even a temporary hospital, the remaining one-third is held in reserve, either to accompany the cavalry, if it pursues the enemy, or to assist the dressing station party, if they require help.

The A.M.O. is attached to the staff of the general officer commanding and obtains the G.O.C.'s sanction before ordering the formation of a dressing station.

The Testing of Explosives for Sensitiveness to Shock by the Drop-hammer Method. (By Dr. H. Kast, Berlin. Translated from the *Zeit für das gesamte Schiess- und Sprengstoffwesen* for 15th July, 1909. By W. J. Williams, F.I.C.)—The Royal Military Experimental Bureau of Berlin has been occupied for the last 20 years in the examination of explosives for military purposes. The degree of the sensitiveness to shock of these explosives is of great significance in regard to their availability. Hence the testing of their sensitiveness has always been of great importance in the investigations of this bureau.

Professor Lenze, at the last congress in Rome, reported exhaustively on the accumulated results of these investigations, so that it is unnecessary to refer to them further.

It need only be remarked that experience has shown that the drop-hammer must not be allowed to act directly on the explosive, chiefly for the reason that the sensitiveness, as ascertained by means of the drop-hammer, depends in the greatest degree on the area of the struck surface, and it is not possible to keep the struck surface unchanged under the direct action of the drop-hammer.

If the drop-hammer is allowed to act directly, or indirectly through an interposed piston, on an uneven layer of the explosive spread directly on the anvil, the area of the struck surface will change in proportion to the varying thickness of the layer in different spots. But then it is impossible to obtain strictly proportional values, because the percussive energy is distributed over surfaces of different area.

This drawback can be avoided by interposing a contrivance between the drop-hammer and the anvil, which is so arranged that only a strictly defined surface is exposed to the blow.

This contrivance must comply with the following conditions:—

1. The surface to be struck must be a definite and invariable area.
2. The explosive must be so arranged that it cannot spread out sideways.

The chief aim in the examination of the explosive is to bring those properties into prominence which are determined by its physical condition (state of aggregation, softer or harder consistency, plasticity, fusibility,

Germany.

density). Therefore the explosive should be tested in a layer of defined thickness, but otherwise unalterable, both in the fluid and solid state, and at a suitable temperature.

For example, guhr-dynamite and gelatin-dynamite are more sensitive than blasting gelatin; powdered explosives are more sensitive than grained explosives; colloided gun-cotton powders are less sensitive than gun-cotton; chlorate explosives, enveloped in soft, plastic substances, are less sensitive than those prepared without such envelopes; nitroglycerin is less sensitive than dynamite.

3. Any frictional action of the blow must be avoided as carefully as possible, as explosives behave quite differently under friction to what they do under percussion.

Thus the chlorate explosives are more sensitive than dynamite to friction, but less sensitive to percussion.

Further, the explosives must not be rubbed between hard materials. For this reason it is not permissible to add frictional materials (powdered glass, sand) for the artificial augmentation of the sensitiveness to shock in the comparison of dissimilar explosives, since that would affect the natural ratios of explosives sensitive to friction too seriously.

Special methods are used for testing the sensitiveness to friction.

4. There must be a constant increase of sensitiveness with the height of the fall.

5. The limits of sensitiveness must be the same whether the tests are made starting with a low fall up to a higher, or the reverse.

In the ordinary way of testing this is by no means always the case; it is very frequently observed that quite different limits are recorded when the fall starts low and is increased, than in reverse order, starting high and ending low. The reason for this variation is that in the latter case the drop-weight and the anvil are heated to a greater degree, both by the explosives and by the conversion of the energy of the blow into heat, hence the explosive is, to some extent, tested at a higher temperature, in the latter case.

6. The values found at different times must agree with one another within certain narrow limits; and in particular the ratio of the sensitiveness towards that of the explosives with which it is compared must be constant.

7. The force of the blow developed with different weights for the given time values must be about the same; but it must also be recognized that by the use of different weights the ratio of sensitiveness is somewhat changed, on account of the different physical properties of the explosive, the varying velocities of impact,¹ and the different dissipation of the kinetic energy because of the greater rebound of the lighter weights.

Explosives which can easily evade the blow (e.g., fluids like nitroglycerin) show themselves more sensitive to a light, swift-acting weight than to a heavier weight.

¹ The end velocity of the drop-weight amounts to 0.99 metres with a 5-cm. fall, to 3.43 metres with a 60-cm. fall; the duration of influence with a 1-mm stamp is 0.001 seconds for 5-cm. fall, and 0.0003 seconds for 60-cm. fall.

Germany.

8. Sharp differences should be observed with low falls, since experience shows that these differences are less marked as the height of the fall increases.

9. Proportionally insensitive explosives should also be tested comparatively.

10. It must be determined, beyond any doubt, whether the explosion is entire or only partial, or whether the explosive has merely burned; from these results conclusions can be drawn as to the danger of unexpected detonation induced by shock.

Care must be taken that the layer of the explosive exposed to the blow is not too thin, as this renders explosion more difficult.

In the ordinary way of testing, the air-waves from the drop-weight, and those produced by partial explosion, blow away the explosive, especially when pulverulent, so that the sample appears to have been completely exploded.

These conditions are best fulfilled by the apparatus² now to be described. It has been used for the last four years in the Military Experimental Bureau expressly for testing sensitiveness, and has shown itself to be reliable. The most convenient form, and the dimensions of the different parts, have been developed from a series of experiments. The apparatus has the following merits:—

1. The striking surfaces are exactly one-half a square centimetre (0.0775 square inch).

2. The separate parts can be accurately adjusted.

3. It is light and easy to clean,³ and to remove the residues of the explosive.

4. The separate parts can be easily replaced if they are damaged or too much worn.

5. The drop must not exceed 60 centimetres (2 feet) (see table below) for the most insensitive explosives.

6. The required quantity of explosive can be easily measured in the apparatus itself or can at least be easily judged.

7. Any special reaction of the explosive is easily recognized.

The following precautions must be observed in using the apparatus:—

1. It must be so arranged that both the stamps fit the ring without any play, and the ring must move easily up or down the stamps.

2. The stamps must be well hardened, so that they do not upset (burr) with use, and do not crack.

² For diagrams of the apparatus see *Zeit. Schiess- und Sprengstoffwesen* 1, 289 (Fig. 5), 1906. Reports Rome 2, p. 529, Fig. 6, 1907. Kast, *Anleitung zur chemischen und phys. Untersuchung der Spreng- und Zündstoffen*, p. 1015, Fig. 238.

³ With certain explosives, such as the easily fusible nitro-compounds, it frequently happens that the fused matter is pressed in between the stamp and the ring, and this binds the stamp. In that case a vice or a pipe-wrench is necessary to withdraw the stamp. This causes no difficulty in the use of the apparatus.

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3. Both striking surfaces must be ground smooth, and must be exactly 8 millimetres (0.315 inch) in diameter.

4. Three different apparatuses must be used in succession in each experiment, so that any erratic action of one or the other may be detected. The apparatuses must be fixed in a cylindrical bed on the anvil to avoid damage from the drop weight.

After measuring out the prescribed quantity, the explosive is pressed together by twisting both stamps so that there is an even layer over the whole surface.

5. The experiment must be effected at a definite temperature—from 18° to 20° C. is best.

6. An apparatus which has become hot from use is cooled down to the experimental temperature.

7. At least two different drop weights must be used. The choice of weights is regulated by the sensitiveness of the explosive.

The maximum drop is:

For 2 kg. (4.4 lbs.).....	60 cm. (2 feet)
For 5 kg. (11.0 lbs.).....	30 cm. (1 foot)
For 10 kg. (22.0 lbs.).....	24 cm. (9 3/5 in.)
For 20 kg. (44.0 lbs.).....	20 cm. (8 inches)

These are sufficient for all cases. Besides the use of higher drops soon spoils the apparatus.

8. The experiment is conducted by making six trials at each height, and repeating these twice on each apparatus.

9. The effect on the explosive is accurately defined. The different points are:—

A. No action.

B. Slight action, i.e., the appearance of smoke, a smell of burning, explosion without audible report.

C. Explosion, subdivided into: (a) slight explosion, i.e., slight report; (b) strong explosion, i.e., loud report; (c) complete explosion.

10. The height is to be decreased until no action follows in any single instance, and is then raised until either the limit of height for the given weight is reached, or a complete explosion is obtained in all six trials.

11. The limit of sensitiveness is held to be that height from which, in as nearly as possible an unbroken series, at least one single distinct explosion occurs.

If two different explosives have their limit of sensitiveness at the same height, that height at which explosion occurs regularly is to be taken as the distinctive standard height.

12. The experiments must be carried out twice, on two different days.

13. Special peculiarities must decide the quantity of explosive used, In the tests of the Military Experimental Bureau an average quantity of 0.04 gram (0.62 grains) is used, which is measured out in a small cup (primer cap).—*United States Naval Institute Proceedings from Franklin Institute.*

New Manœuvre Regulations.—The new Regulations for Roumania, manœuvres and the infantry combat are the work of General Crainiceanu, the present Minister of War.

The regulations consist of an introduction and three parts: The instruction of units, combat, and parade. The introduction emphasises the necessity of initiative on the part of the subordinates who, in their sphere of action, are not to be limited by their superiors.

The instruction of the units, as far as regards the company, lays down in principle, that the fighting formation is the firing line. Ordinarily speaking, the entire *peloton* deploys. Two methods of firing are provided for, independent and volley firing. The feeding of the firing line is carried out, as the case may be, by prolongation or by reinforcement. This last procedure is only a *pis-aller*, it ought to be avoided as much as possible.

The battalion in action comprises a firing line and a reserve. It is the duty of the battalion commander, at the beginning of the engagement, to fix the position of the reserves, the machine guns, the ammunition caissons, and the dressing stations. He gives the order to open fire. The part of the regulations devoted to combat is an abridged course of tactics. Officers are advised to develop their judgment on the spur of the moment, by the exercise of their specific *métier*, the manœuvres and the study of the business of war.

The principles laid down by the regulations are: the necessity of the co-ordination of the efforts demanded from the different units, which is effected by the direction of the commander, who points out the object to be attained, and informs his subordinates of the decision at which he has arrived. He ought only to modify it in very extreme cases at the risk of hesitation and blunders.

The new regulations have utilised the lessons of recent wars, and followed the trend of ideas, which tend to give more scope to the initiative of subordinates on the condition of their acquiring the necessary knowledge and experience.

The Army Estimates for 1910-1911 and the Reorganisation of the Roumanian Army.—A new Law for the reorganisation of the Army was voted by the Parliament last March. Its object is to obtain greater resources in men, and it achieves that by increasing the length of service in the reserve and the total length of military service up to 42 years of age in place of 40. A new Law relating to the cadres is in preparation, but has not yet been voted; the 1910-11 Budget, however, appears to contain, if not the whole, at least a great part of the modifications which are to be made in the constitution of regiments and their grouping.

For this reason, this year's Budget deserves a detailed examination, although a definitive opinion on it cannot be formed until the details of the new Cadre Law have been made known.

The Army Estimates, which last year amounted to £2,246,986, have risen for this year to £2,446,986, an increase of £200,000.

This year's Estimates also provide that the Communes are to pay into the Treasury the following sums for the companies or sections of *pompiers*, which are attached to them:—

Roumania.

Bucharest	£7,440
Jassy	3,790
Galatz	1,680
Craicova	1,680
Plochti	1,520
Braila	1,520
Focshani	1,280
Botoshani	1,280
Bucan	1,280
Roman	1,280
Piteshi	1,280
Gurgevo	1,280
Total	£25,240

These sums will be repaid to the Communes as soon as they organise their own Corps of *pompieri*, and the troops of artillery devoted to this service are withdrawn. The sums reimbursed will be in inverse proportion to the time during which the artillery will remain at the service of the Communes.

Independently of the increase of £200,000 already mentioned, it is as well to point out that this year there has been a reduction made under certain heads and by the suppression of units of £200,000, an economy which, however, has been transferred to other heads for the improvement or creation of new units. The Budget must be thus considered to be increased this year by £400,000.

Among the principal increases which may be noted are:—

£40,000 for the increase of the pay of officers in accordance with the new Law of March of this year. These increases start from 1st April as regards the pay of subaltern officers, and from the 1st October for majors, and the 1st January, 1911, for generals, colonels, and lieutenant-colonels;

£25,200 for the increase of the pay of 216 sub-lieutenants, who will leave the Military Schools on the 1st July next;

£6,000 for the increase of the *personnel* and of the *matériel* of the Military Schools owing to the increased number of pupils to be sent to them;

£10,000 for the increase of the pay of men re-engaged for long service (warrant officers, sergeant-majors, non-commissioned officers, etc.);

£34,000 for forage, etc.;

£3,400 for the military hospitals;

£2,800 for barracks and fortifications. Up to the present, a certain number of small repairs have been carried out by means of petty economies carried out at the expense of the men in their food, etc.;

£2,000 for the geographical service of the army, for the completion of the survey of the country;

Finally, £40,000 for "Instruction and Manœuvres," intended for the calling out of a number of men on leave and a much larger number of reservists.

On the other hand, certain economies have been effected in the Budget this year by:—

Roumania.

The suppression of the School for soldiers' children at Tagoviashté;

The suppression of the mountain battery which has existed up to the present;

The suppression of three companies of the Army Administration Corps, work for the men of which can no longer be found since repairs, etc., are now carried out in the various Corps, and the more important work of other kinds is carried out in the central manufactory at Bucharest;

The suppression of the 5th and 6th Squadrons of four regiments of *Roshiori* (Nos. 1, 6, 8, and 10), which up to the present have had six. It has been found that the proportion of cavalry which the Roumanian Army possessed was too large for the effective available, especially as Roumania is a country where the resources as regards horses are very limited.

The economies thus realised, joined to a saving effected in last year's Budget in consequence of the incorporation of a smaller contingent of men than had been the case in previous years, have been devoted:—

1. To the creation of six machine gun sections, which will use the six machine guns that the Roumanian Army possesses. These units will be attached to the six regiments of *Roshiori*;

2. To the creation of a dépôt squadron in every regiment of cavalry (Escort regiment and the regiments of *Roshiori* and "*Calarashi*");

3. To the creation of a permanent School of Firing for field artillery, and of a trial range for artillery at Mihaiu Bravul (2nd Army Corps, to the south of Bucharest);

4. To the creation of the commands, staffs, troops and permanent services of a Reserve division, to be called the 10th Reserve Division, as well as of the commands, troops, and permanent services of a Vth Army Corps to be formed of the 9th Active Division (*Dobrudzeka*) and of the new 10th Reserve Division.

The new Budget provides for the following effectives:—

3,944 Officers (an increase of 109);

656 Professors or Civil Officials (an increase of 67);

81,606 Non-Commissioned Officers and men (a decrease of 6,510, of whom 2,934 are re-engaged long-service men);

17,981 Horses (a diminution of 939).

The soldiers receive 40 *bani* per man per day, intended for their sustenance, to the exclusion of deductions and economies, which were formerly made, and of which the total amounted to 8 or 10 *bani* per man per day (100 *bani* = 9 3-5d.).—*Revue Militaire des Armées Etrangères*.

CORRESPONDENCE.

"THE PROPOSED CHANGES IN CAVALRY TACTICS."

To the Editor of the JOURNAL OF THE ROYAL UNITED SERVICE INSTITUTION.

SIR,—May I be allowed to point out that one particular argument of Mr. Erskine Childers was not met by Colonel Kenna or by any of the other speakers.

When I spoke about the necessity of "husbanding" cavalry if they were to be used for "shock tactics," I was not thinking of a general engagement, or of treating the comparatively small number of rifles which our dismounted cavalry might afford, "as those of infantry in the original dispositions of a main battle," though I see now that my words might bear that interpretation. I was thinking rather of inter-cavalry combats—either those which would occur between the cavalry screens before the respective infantries got into touch, or those which would result beyond the fronts of the infantries in a general engagement owing to the efforts of the cavalries to make use of their mobility by making wide turning movements. I had in my mind especially Mr. Erskine Childers' comments on the actions of Zand River and Diamond Hill (see p. 193 of "War and the *Arme Blanche*"). Take the case of two cavalry screens of equal numbers and morale, one of which has discarded the *arme blanche* altogether, while the other retains it, and in order to be able to make use of it, "husbands" a certain proportion of its force. I understand Mr. Erskine Childers would argue that the off chance of the "husbanded" cavalry getting an opportunity for an *arme blanche* charge, though not quite negligible, would not compensate for the certain loss of rifles in the firing line; for I take it that it is admitted on both sides that in such circumstances the rifle would dictate the tactics over the greater part of the field, and in all but exceptional moments. I should be glad, therefore, if Colonel Kenna, or some other cavalry officer of experience, would consider this point, and tell us roughly what proportion of the whole force of cavalry should be "husbanded" so as to be available for shock tactics at the critical moment; for the more you "husband," the more you weaken the firing line, while the less you "husband" the less is the probability that what there is available will be at the right spot at the right moment—a probability which in any case is small enough if, as at Diamond Hill, the firing lines extend over thirty miles or so of front.

The question is of peculiar interest to those who, like myself, belong to Territorial mounted brigades, armed with fire weapons only, but which would have to encounter *arme blanche* cavalry in war. And as peace manœuvres do not appear to throw any valuable light upon it, it is only to those who have had actual experience in the field that we can appeal for information and guidance.

I remain,

Yours truly,

EDWARD T. DIXON,

4th December, 1910.

Major Hants R.H.A.

The Hard, Hythe, Southampton.

NAVAL AND MILITARY CALENDAR.

NOVEMBER, 1910.

- 3rd (Thur.) 1st Bn. Gloucestershire Regiment left Bombay for Portsmouth per *Plassy*.
- 4th (Fri.) H.R.H. the Duke of Connaught inaugurated first Parliament of United South Africa.
- " " 2nd Bn. Gloucestershire Regiment embarked at Portsmouth for Malta per *Rewa*.
- 7th (Mon.) 1st Bn. Yorkshire Light Infantry embarked at Cape Town for Hong-Kong per *Hardinge*.
- 10th (Thur.) XVIIIth Brigade, R.F.A. embarked at Durban for Karachi per *Northbrook*.
- 12th (Sat.) 9th Lancers embarked at Durban for Southampton per *Soudan*.
- " " 2nd Bn. Gloucestershire Regiment arrived at Malta per *Rewa*.
- " " 3rd Bn. King's Royal Rifle Corps left Malta for Karachi per *Rewa*.
- 14th (Mon.) Centenary of the commencement of Marshal Masséna's retreat from before the Lines of Torres Vedras.
- 16th (Wed.) Arrival of the 1st and 3rd Divisions of U.S. Atlantic battle-fleet at Portland and Gravesend, respectively.
- 18th (Fri.) Launch of the 2nd Class cruiser *Weymouth* from the Elswick yard.
- 24th (Thur.) Arrival of the 1st Bn. Gloucestershire Regiment at Southampton from Bombay per *Plassy*.
- " " Arrival of XVIIIth Brigade, R.F.A. at Karachi per *Northbrook*.
- 25th (Fri.) Arrival of 3rd Bn. King's Royal Rifle Corps at Karachi per *Rewa*.

Addenda to October Calendar.

- Oct. 11th Fiftieth anniversary of King Victor Emanuel's entry into Neapolitan Territory and taking command of the combined Sardinian army and forces under Garibaldi.
- " 21st Fiftieth anniversary of Plebiscite at Naples and of the Sicilians, the result of which was almost unanimous demand for annexation to the Kingdom of Sardinia.

FOREIGN PERIODICALS.

NAVAL.

ARGENTINE REPUBLIC.—*Boletín del Centro Naval*. Buenos Aires: September, 1910.—“The Argentine Navy in History.” “Armament of Ships of War.” “Some Considerations on Scouting.” “The Laubeuf Scouting System.”

AUSTRIA-HUNGARY.—*Mittheilungen aus dem Gebiete des Seewesens*. No. 12. Pola: December, 1910.—“The Further Development of the Battleship.” “The Autogenous Welding or Cleavage of Metals.” “The French Naval Manœuvres, 1910.” “The English Parliamentary Report on the Expenditure of the Seven Greatest Sea Powers.”

BRAZIL.—*Revista Marítima Brasileira*. Rio de Janeiro: September, 1910.—“Seventh of September.” “Chili-Brazil.” “The Rejuvenation of the Officers' Corps of our Navy.” “Aeroplanes in Our Navy.” “Differences between the Torpedoes BR/41 and BR/42 and the Torpedoes BR/33.” “The Armstrong Air Heating Apparatus.”

CHILI.—*Revista de Marina*. Valparaiso: September, 1910.—“The National Navy in the War of Independence.” “The Act of Independence.” “Fight between the *Lantaro* and the *Esmeralda*.” “The First National Squadron.” “Capture of Valdivia.” “Official Part of the Capture of the *Esmeralda*.” “Homage to the Heroes of the Independence.” “Homage to the Argentine People.”

FRANCE.—*Revue Maritime*. Paris: October, 1910.—“Official History of the Russo-Japanese Naval War (Part II.)” “The Port of Genoa and the Roads giving Access to the Alps.” “The New Spanish Navy.” “The Dreadnoughts of the World.” “Transmission of Orders in Steamships.”

La Marine Française. Paris: November, 1910.—“The Necessary Armament.” “M. de Lanessan against MM. Monis and Painlevé.” “The Treason of the Capitalists.” “Exceptional Jurisdiction.” “The Naval Tribunals.” “Intendence and Worthlessness.” “A Reform dedicated to M. Chéron.”

La Vie Maritime. Paris: 10th November, 1910.—“And the Programme?” “A Book: Let us Reconstruct our Navy.” “A Series of Trials.” “The Torpedo not Sleeping . . . but Dying.” “Fifteen *Braunschweigs* against Eight *Satsumas*.” 25th November.—“The Building up of our Naval Forces.” “Officers of the Navy and Artillery Engineers.” “Glance at the Russian Baltic Fleet and its Strategical

Rôle." "Our Ships on Trials." "Collision of Submarines." "A Ceremony on Board the *Patrie*."

Le Yacht. Paris: 5th November, 1910.—"Trials to be Made with Submarines." "Yachting Notes." 12th November.—"Making the Land in Fogs." "Yachting Notes." "The Large Modern Battleships." "Japanese Naval Constructions." "The Superior School of the Navy." 19th November.—"The Duties of the Under-Secretary of State for the Navy." "Yachting Notes." "The Cruisers *Alger* and *Cumberland* at Algiers." 26th November.—"The Organisation of Our Reserves." "Yachting Notes." "The Embarkation of Frigate Captains." "The New Regulations for the Interior Economy of Ships."

Le Moniteur de la Flotte. Paris: 5th November, 1910.—"The Personnel of the Fleet." "Aviation in the Navy." "The Internal Economy on Board Ship." 12th November.—"The New Minister of Marine: Vice-Admiral Boué de Lapeyrère." "The Duties of the Under-Secretary of State." "Ships for Auxiliary Duties." "The Commissariat School." 19th November.—"A Four-Unit Division." "The Navy in Parliament." 26th November.—"Engines of Fixed Defence." "The Navy in Parliament." "Visit of the U.S. Squadron."

GERMANY.—*Marine Rundschau*. Berlin: December, 1910.—"The Officers' Corps and Public Opinion." "The Netherlands' Naval Manœuvres, 1909 and 1910." "English Parties and their Attitude to the Defence Question" (concluded). "The English Board of Admiralty" (concluded). "Sea Fisheries and Steam Traffic in North Europe" (concluded). "The Cruise of the Cruiser Squadron to the South Seas, Summer of 1910." "The 12th Ordinary Meeting of the Technical Society of Naval Constructors." Exchange of Opinions on the Essay, "Views on the Education of our Petty Officers."

ITALY.—*Rivista Marittima*. Rome: October, 1910.—"Four Recent Types of Dreadnoughts." "How to Deduce the Muzzle Velocity from the Rate of Flight of the Projectile." "On the Replanning of the Port of Palermo." Letter to the Director: "On the Priority of the Invention of Wireless Telegraphy." Supplement.—"Comparative Study on the Ordinary Tables of Trigonometrical Logarithms."

PORTUGAL.—*Revista Portuguesa, Colonial e Marítima*. Lisbon: September and October, 1910.—Have not been received.

Anuário do Club Militar Naval. Lisbon: October, 1910.—Has not been received.

SPAIN.—*Revista General de Marina*. Madrid: October, 1910.—"Naval Education in England and Analysis of its Adaption to Ours." "Target Practice." "Construction, Management, and Organisation of Modern Ships of War" (continued). "A Specimen of the Old Military Spirit." "Official History of the Russo-Japanese Naval War" (continued).

MILITARY.

AUSTRIA-HUNGARY.—*Danzer's Armee-Zeitung*. Vienna: 3rd November, 1910.—"The Project of a Military Convention between Turkey, Roumania, and Austria-Hungary (A Military-Political Study)." "The Worthlessness of Military Espionage." "From the Manœuvre Map of a French Senator." 10th November.—"What is Happening with Bosnia?" "To the Extreme." "Men's Reading Rooms." "A Single Type of Projectile." "German Words on our Alpine Troops." 17th November.—"Austria and the Literature on the War of Liberation." "Officers' Servants." "On the Outlook for Employment of Pensioned Officers." 24th November.—"Between Two Delegations." "The Present Condition of the Roumanian Army." "From a Reading Book for Italian Soldiers." "German Words on our Alpine Troops."

Streffleur's Militärische Zeitschrift. Vienna: November, 1910.—"Motor Balloons and Kites." "War Moral: Its Preparation in Peace." "Military Training for Youth in Austria." "Montenegro in the Year 1910." "On the Prophylaxis of the Venereal Disease." "Communications from the Army School of Musketry."

Kavalleristische Monatshefte. Vienna: November, 1910.—"The Activity of the Cavalry in the German Kaiser Manœuvres, 1910." "The Attacks of the French Cavalry under General Gallifet at Sedan." "The Close and Battle Scouting of the Cavalry Division." "Wheeled or Portable Cavalry Machine Guns." "The Military Importance of Mounted Sports." "Garrison Race Clubs." "Men's Patrol: Prize Ride of the Alexander Uhlans at Pardubitz."

BELGIUM.—*Bulletin de la Presse et de la Bibliographie Militaires*. Brussels: 15th October, 1910.—"The Battle of the Future" (concluded). "Considerations on the Organisation of the English Army" (concluded). "The Cavalry Divisions at the Imperial German Manœuvres in 1909." 31st October.—"Law Regulating the Cadres and Effectives in France (Infantry, Cavalry, Engineers). Considerations on the Composition of the Infantry Company and Battalion." "The Echelon of Convergeence and the Influence of the Intervals of Guns, of the Distance and Bearing of the Object, when the Gun is Laid with the Goniometer or Panoramic Glass." "The Cavalry Divisions at the Imperial German Manœuvres in 1909" (continued).

FRANCE.—*Journal des Sciences Militaires*. Paris: 1st November, 1910.—"The Command." "The Communication between the Arms during Battle." "Study of the Preparatory Battle" (continued). "An Incident of the Russo-Japanese War." "Studies on the Army of Africa: The Reorganisation of the Light Infantry Battalions." "Reflexion on Some Consequences of the Franco-German War (1870-71)." 15th November.—"The Communication between the Artillery and Infantry." "The Provisional Field Artillery Manœuvre Regulations." "Study of the Preparatory Battle" (continued). "Studies on the Army of Africa: Reorganisation of the Light Infantry Battalions" (concluded).

Revue d'Infanterie. Paris: September, 1910.—"The Japanese in Manchuria." "The Native Question in North Africa." "Teaching and Importance of the Actual Value of Infantry Fire."

October, 1910.—"The Japanese in Manchuria" Part I. (concluded). "The Native Question in North Africa" (concluded). "Teaching and Importance of the Actual Value of Infantry Fire" (concluded). "Two Months with the Chaoula." "

Revue de Cavalerie. Paris: October, 1910.—"German Ideas on Cavalry." "Apropos of the Reform of the Cavalry Training Regulations." "Fischer and the Origin of the Chasseurs" (continued). "Conformation and Choice of the Cavalry Horse."

Revue d'Artillerie. Paris: October, 1910.—"Eddying Movement of the Air in the Concave Region of a Curved Wing Working at a Slight Inclination." "Study of the Aviation Problems." "Competition of Q.F. Mountain Matériel in Turkey." "Heavy Balance Automobiles."

Revue Militaire Générale. Paris: November, 1910.—"The Doctrine of National Defence." "The Battle of the Shaho" (concluded). "The Eventual Enemy." "Studies on the 18th August, 1870" (concluded).

Revue d'Histoire. Paris: November, 1910.—"The Campaign of 1908-9 in Chaoula" (continued). "The Recruiting in the Landes from 1789 to 1798." "Zürich." "The Manœuvre of Pultusk" (continued). "The War of 1870-71: the National Defence in the Provinces" (continued). Documents: "The Battle of Hohenlinden (Extracts from the Memoirs of General Decaen)."

Revue Militaire des Armées Étrangères. Paris: November, 1910.—"The New Organisation Laws of the Italian Army." "The Career of the German General Staff Officer."

GERMANY.—*Militär-Wochenblatt.* Berlin: 1st November, 1910.—"The Journey of the Crown Prince." "Military Society of Berlin (Notices)." "One Hundred and Fifty Years Ago: Torgau." "News from the French Army" (concluded). "Military-Technical Review: Artillery Observations." 3rd November.—"Field Service Regulations of the U.S. Army, 1910." "One Hundred and Fifty Years Ago" (continued). "Reminiscences of the Memorial Celebrations upon the Battlefields round Metz." 5th November.—"Speech of General Graf Schlieffen at the War Academy, 15th October, 1910." "One Hundred and Fifty Years Ago" (continued). "Field Service Regulations of the U.S. Army, 1910" (concluded). "A New Turkish Pension Law." 12th November.—"An Episode of the Battle of Vionville—Mars La Tour." "Field Artillery in Co-operation with Infantry, 1870-71, and To-day." 15th November.—"Out of the Life of the Late General of Cavalry, Freiherr von Nagel." "Something More about the Efficiency of Field Artillery." "An Episode of the Battle of Vionville—Mars la Tour" (concluded). "From the U.S. Army." 16th November.—"Military Society of Berlin (Notices)." "The Boer War and its Tactical Lessons According to German and English Conceptions" (continued). "Concentrated Horse Fodder." "Something on the Efficiency of Field Artillery" (concluded). "Recruits' Instruction in Turkey."

19th November.—"The 50th Year Service Jubilee of H.R.H. Prince Ludwig of Bavaria." "The Boer War and Its Tactical Lessons According to German and English Conceptions" (*continued*). "Training and Summer Exercises in Italy." 22nd November.—"What do we learn for the Training of our Officers, Men, and Horses from the Experience of the Ride for the Kaiser Trophy in 1910?" "On the Shortness of Officers in the English Army." 24th November.—"Military Society of Berlin (Proposal)." "A New Russian Infantry Battle Regulation." "Army and Fleet in the Fight." 26th November.—"Over the Failures in Scouting at the Manœuvres." "A New Russian Infantry Battle Regulation" (*concluded*). "Training of Youth in the Military Spirit." 29th November.—"Military Society of Berlin (Notices)." "The 80th Birthday of General of Infantry von Leszczynski." "News from the French Army." "Military-Technical Review." "News in the Province of Aviation."

Artilleristische Monatshefte. Berlin: October, 1910.—"The Air Resistance of the Projectile According to the Kinetic Theory of Gases." "Experiments with Uniform Projectiles." "Artillery Observations in the Fighting Round Port Arthur" (*concluded*). "On a New Deport Carriage."

Jahrbücher für die Deutsche Armee und Marine. Berlin: November, 1910.—"The Approach Fight." "This Year's French Autumn Manœuvres." "Army Reserves." "Healthy People the Source of Life of the Army." "Coalition Army." "The Question of the Simplicity of Our Field Artillery Matériel."

ITALY.—*Rivista di Artiglieria e Genio.* Rome: October, 1910.—"Lieutenant Giuseppe Saglietti." "The Regulations on Field Artillery Practice in the Principal Armies (Field Guns Only)." "The Ventilation and Heating of a Military Hospital." "Barbette Batteries with Shields for the Gun Detachments."

Rivista Militare Italiana. Rome: 16th November, 1910.—"Organic Changes of the Sardinian Army." "The Supply Services in Times of Peace and War" (*concluded*). "How Battles are Lost and Won." "Four Tactical Exercises." "Bartolomeo Colleoni" (*continued*). "Organisation of Staff Services with Motor Cars." "The Struggle between Coast Batteries and Ships Guns" (*to be continued*). "At the Late Naval Manœuvres." "Some Ideas on Our Training Manual." "Schools of Gunnery." "Statistical Notes about the Category of Recruits of the year 1888."

SPAIN.—*Revista Técnica de Infantería y Caballería.* Madrid: 1st October, 1910.—"The Organisation of the Spanish Army as viewed by a Prussian" (*continued*). "Infantry Fire at Long Ranges." "Aerostation in Our Army" (*continued*). 15th October.—"The Organisation of the Spanish Army as viewed by a Prussian" (*continued*). "Aerostation in Our Army" (*continued*). "The Infantry in the French Army." 1st November.—"The Organisation of the Spanish Army as viewed by a Prussian" (*continued*). "The Infantry in the French Army" (*concluded*). "Aerostation in our Army" (*continued*). 15th November.—"The Organisa-

tion of the Spanish Army as Viewed by a Prussian" (*continued*). "Aero-station in Our Army" (*continued*).

Revista Científico Militar y Biblioteca Militar. Barcelona: 10th November, 1910.—"Lessons from the Riff War" (*continued*). "My Impressions in the Riff Campaign, 1909" (*continued*). "New Organisation of the Italian Army" (*continued*). "Organisation of the French Artillery."

SWITZERLAND.—*Revue Militaire Suisse.* Lausanne: November, 1910.—"The Battle of Neuenegg, 5th March, 1798." "Apropos of the New Organisation of the Army." "The Cavalry Division in the Manœuvres, 1910." "Once More the Ehrhardt van Essen High Explosive Shrapnel and the Krupp Shrapnel Shell."

UNITED STATES.—*Infantry Journal.* Washington, D.C.: November, 1910.—"Militarism." "Retirement versus Elimination." "German Ideas on Tactics." "The Maxim Silencer and its Effect upon Future Military Operations." "Methods of Study." "Changes in Law and Regulations Necessary in Order to Reorganise the Army of the United States on a Tactical Basis." "The Infantryman's Load." "General Beer and the Infantry."

Journal of the U.S. Cavalry Association. Fort Leavenworth, Kansas. November, 1910.—"The Fort Reno Remount Station." "Cavalry Training." "The Tactical and Strategical Use of Balloons and Aeroplanes." "Care of the Horse's Hoof." "Notes of the Progenitors of Certain Strains of the Modern American Horse." "Endurance Races." "Cavalry in War and Peace." "The Chancellorsville Campaign."

NOTICES OF BOOKS.

Privateers and Privateering. By Commander E. P. STATHAM, R.N. London: Hutchinson & Co., 1910.

The privateersman, scouring the seas in his swift, rakish craft, plundering the merchant vessels of the enemy, and occasionally engaging in a desperate encounter with an opponent of his own class, or even with a man-of-war, has always presented a romantic and fascinating personality, especially to youth, and, if he has often been confounded with his first cousin, the pirate, it must be admitted that there has been considerable justification for the mistake. The privateer is a licensed, the pirate an unlicensed plunderer; but plunder, not patriotism, being, as a rule, the motive of the former, it is, perhaps, not altogether surprising that he occasionally adopted the tactics of the latter. The author makes no pretence of his book being a history of privateering; it is rather a collection of true stories of privateering incidents, and heroes of what

the French term *la course*, and there is much in it that will interest a large class of readers.

The author is at some pains to explain the difference between a privateer and a vessel sailing under "letters of marque," and during the middle ages and probably up to the latter part of the sixteenth century, there was a difference between the two, but for practical purposes by the beginning of the eighteenth century the two were identical. As long ago as 1243, King Henry III. issued regular patents or commissions to certain persons, seamen by profession, "to annoy the King's enemies by sea or land wheresoever they are able," and enjoined all his faithful subjects to refrain from injuring or hindering them in this business; the conditions being that half the plunder was to be given to the King, "in his wardrobe"—that is his private purse. This is a genuine instance of what was known later as privateering; and it will be noticed that the "King's enemies" are specified as the only persons against whom the commission held good; and it is an essential characteristic of privateering: that it can only be carried on when a state of war exists. On the other hand, the issue of a "Letter of Marque" did not originally constitute an act of war; it was, in fact, a license to a private individual to recover by force from the subjects of another sovereign goods of which he had been despoiled; the practice dates back, certainly, to the early part of the twelfth century, and probably further; and it was in use in England until the time of Charles II., or later. Thus in the reign of Edward I. the ship *St. Mary*, belonging to one Bernard D'Ongressill, when on a voyage from Barbary to England, was seized off Lisbon by some Portuguese armed men and taken into that port, the King of Portugal, it is reported, receiving one-tenth of the plunder, the two countries being at peace at the time. The owner promptly applied to be granted letters of marque against the Portuguese, to take whatever he could from them, until he had made up his loss, and the requisite authority was granted him to "seize by right of marque, retain and appropriate the people of Portugal, and especially those of Lisbon and their goods, wheresoever they might be found," for five years, or until he had obtained restitution. The one condition, apparently, was that letters of marque should not be granted until every effort had been made to obtain a peaceful settlement.

By the middle of the sixteenth century the fitting out of vessels by corporations and individuals for their own protection, and the "annoying of the King's enemies," with the further advantage of substantial gains by plunder, was clearly recognised, for we find King Henry VIII., in the year 1544, remonstrating with the Mayor and burgesses of Newcastle, Scarborough, and Hull, for their remissness in this respect, one of his pleas being that "It were over-burdensome that the King should set ships to defend all parts of the realm, and keep the narrow seas withal." In the American and French wars of the 18th and early part of the 19th centuries, there were literally thousands of privateers engaged. It seems to have been admitted, however, even in those days, that privateers were a scourge, especially to neutrals, and were but little removed from pirates, an opinion shared by Lord Nelson, who, writing in 1804, said: "The conduct of all privateers is, as far as I have seen, so near piracy that I only wonder any civilised nation can allow them." Privateering

was nominally abolished in 1856 by the Declaration of Paris, although the United States and Spain never subscribed to it, and by ourselves agreeing to the Declaration, many authorities hold that we have most materially weakened our power in the event of war.

Commander Statham gives us brief historical sketches of some of the more noted privateersmen, whose names have been handed down to us, beginning with Andrew Barton, a daring Scotch seaman, who was in high favour with James III. of Scotland and his successor; Barton sailed for some years under letters of marque from the Scotch King, but in July, 1511, under orders from Henry VIII., he was attacked, when on his way home from Flanders, by two ships, commanded by the Lords Thomas and Edward Howard, and after a severe struggle, his ship, the *Lion*, was captured, Barton himself being killed. The author next gives us incidents in the careers of William Dampier, Woodes Rogers, George Shelvocke, John Clipperton, Fortunatus Wright, George Walker, and others.

Of these probably Fortunatus Wright was the greatest and most prosperous; he flourished in the middle of the eighteenth century, the dividends he paid to the various merchants who, from time to time, fitted him out, are stated to have been enormous. He seems to have been no mere filibustering swash-buckler, as so many of the privateer commanders were, but to have been a skilled and gallant seaman, very tenacious of his rights, which on more than one occasion brought him to serious loggerheads with the high authorities. He appears to have had a considerable sense of humour, for when in the Mediterranean he took particular pleasure in taking his French prizes into Malta, knowing that a large number of the Knights of St. John, who then held the Island, were Frenchmen. His little ship, the *Fame*, was the terror of the Mediterranean, and proved herself more than a match for larger vessels, sent out to destroy her.

The author has not confined himself to the deeds of his own countrymen, but we are introduced to such distinguished Frenchmen as Jean Bart, Duguay Trouin, Cassard and Robert Surcouf, whose gallant deeds have been held in such high repute by their countrymen that to this day we find ships in the French Navy bearing their names. He also gives sketches of some noted American privateersmen; on the other hand, he has unfortunately omitted any mention of men like Hutchinson, one of the most daring and able commanders of the many privateers which sailed from the Mersey, and of another equally noted French privateerman, Thurot of Brest.

He describes many stirring actions, among them being the celebrated one between the *Terrible*, commanded by Captain Death, and the *Vengeance* of St. Malo. The *Terrible* was a fair-sized privateer, carrying 200 men and 26 guns, and when cruising off the mouth of the Channel at the end of 1756, she fell in with and captured a valuable French prize; but before she could escort her into Plymouth, the *Vengeance*, a larger vessel with double the crew, and carrying 36 guns, came on the scene. After a desperate fight, the *Terrible*, being completely overmatched, with only one officer and barely a score of men being left to fight the ship, which had also lost her mainmast,

struck her colours, Captain Death being mortally wounded at the moment he gave the order to surrender. There was no discredit to Captain Death in yielding, after so heroic a struggle against such heavy odds, and the merchants of London opened a subscription at Lloyd's Coffee House for his widow, the widows of his crew, and the survivors, who had lost their all, while a rhymester of the day celebrated the gallant fight made by the bold privateersman and his crew in lines, of which the following is the last verse:—

Thus fell the strong *Terrible*, bravely and bold,
But sixteen survivors the tale can unfold.
The French were the Victors, tho' much to their cost,
For many brave French were with Englishmen lost.
For then says old Time, "Since Queen Elizabeth
I ne'er saw the fellow of brave Captain Death."

Commander Statham is to be congratulated on having produced a very readable book on a subject of which but little is known, and he has also added to its interest by giving us many excellent portraits and illustrations.

PRINCIPAL ADDITIONS TO LIBRARY, NOVEMBER, 1910.

The German Spy System in France. Translated from the French of PAUL LANOIR. Crown 8vo. 5s. (Presented.) (Mills & Boon, Ltd.) London, 1910.

Military History for Examinations: Questions on the Russo-Turkish Campaign in Bulgaria, 1877-78. By Lieut.-Colonel H. M. E. BRUNKER. Crown 8vo. 1s. (Presented.) (Forster Groom & Co., Ltd.) London, 1910.

Military Law (Territorial). By Major T. KING. 8vo. 2s. 6d. (Presented.) (Forster Groom & Co., Ltd.) London, 1910.

Guerre Russo-Japonaise, 1904-1905. Historique rédigé à l'Etat-Major Général de l'Armée, Russe. Traduction publiée Sous la direction de l'Etat-Major de l'Armée, 2^e Bureau. Vol. I., Part I. 8vo. 12s. (R. Chapelot et Cie.) Paris, 1910.

Government of India, Meteorological Department. Tables for the Reduction of Meteorological Observations. Prepared by G. C. SIMPSON, Imperial Meteorologist, under the direction of GILBERT T. WALKER, Director-General of Observatories. Crown 4to. (Presented.) (Superintendent Government Printing.) Calcutta, 1910.

La Guerre Serbo-Bulgare de 1885. Combats de Slivince, 17, 18 et 19 Novembre. By Colonel REGENSPURSKY. Translated from the German by Lieutenant BARTH. Crown 8vo. 4s. (Berger-Levrault et Cie.) Paris, 1897.

A Study in Troop Leading and Management of the Sanitary Service in War. By Major JOHN F. MORRISON, General Staff, U.S.A., and Major EDWARD L. MUNSON, Medical Corps, U.S.A. Crown 8vo. 5s. (Presented.) Fort Leavenworth, Kansas, 1910.

Signalling Messages. By a Signalling Officer. 12mo. 3s. (Presented.) (Gale & Polden, Ltd.) London, 1910.

Cavalry Tactics as Illustrated by the War of the Rebellion. Part I. By Captain ALONZO GRAY, U.S. Cavalry. 8vo. 5s. (Presented.) (U.S. Cavalry Association.) Fort Leavenworth, Kansas, 1910.

Principles of the Science of Organisation. By MARSHALL BRUCE-WILLIAMS. Oblong folio. (Presented.) (Chapman & Hall, Ltd.) London, 1910.

Sea Law and Sea Power. By THOMAS GIBSON BOWLES. 8vo. 7s. 6d. (John Murray.) London, 1910.

Chatham, His Early Life and Connections. By Lord ROSEBERY. 8vo. 12s. 6d. (Arthur L. Humphreys.) London, 1910.

Refaisons une Marine. By CHARLES BOS. Crown 8vo. (Presented.) (Berger-Levrault et Cie.) Paris, 1910.

Roll of the Officers of the (84th) York and Lancaster Regiment. Revised, enlarged, and brought up to June, 1910, by Captain R. E. KEY. 8vo. (Presented.) (Wm. Clowes & Sons, Ltd.) London, 1910.

Historical Records of the 20th (Duke of Cambridge's Own) Infantry, Brownlow's Punjabis, from its Formation in 1857 to 1907. 8vo. (Presented.) (Swiss & Co.) Devonport, 1909.

The Story of the Atlantic Cable. By CHARLES BRIGHT, F.R.S.E., etc. 12mo. (Presented.) (George Newnes, Ltd.) London, 1903.

Canada and Canadian Defence. By Major-General C. W. ROBINSON. 8vo. 6s. (Presented.) (Hugh Rees, Ltd.) London, 1910.

The Defence of United South Africa as a Part of the British Empire.
Lectures by Brigadier-General G. G. ASTRON. Crown 8vo. 1s. (Presented.) (Cape Times, Ltd.) Cape Town, 1910.

Statistical and General Report of the Veterinary Service in India of 1909-10. Foolscape folio. (Presented.) (Government Central Branch Press.) Simla, 1910.

The Life Story of Sir Charles Bright, with which is Incorporated the Story of the First Telegraph to America, India and the Colonies. By CHARLES BRIGHT, F.R.S.E. 8vo. 12s. 6d. (Presented.) (Archibald Constable & Co., Ltd.) London, 1908.

Artillery Pay Tables (Manuscript). Crown 8vo. (Presented.) n.p., 1781.

The Diary of Charles Dudley Madden, Lieutenant 4th Dragoons, Peninsular War, 1809-11. (Manuscript.) 8vo. (Presented.) n.p., n.d.

Commemoração Centenária da Guerra Peninsula, 1810-11: Bussaco. (Revista Militar.) 8vo. (Presented.) Lisbon, 1910.

French-English Technical Military Dictionary. By J. A. GENDRE-CHARDOUX. 8vo. 3s. (Presented.) (Wm. May & Co., Ltd.) Aldershot, 1910.

Zur Psychologie des Grossen Kriegeres. By C. von B-K. 8vo. 10s. (Wilhelm Braumüller.) Vienna, 1893-97.

The Official Records of the Mutiny in the Black Watch: A London Incident of the Year 1743. Compiled and edited by H. D. MACWILLIAM. Crown 4to. 12s. 6d. (Presented.) (Forster Groom & Co., Ltd.) London, 1910.

Wellington's Battlefields Illustrated: Bussaco. By Lieut.-Colonel G. L. CHAMBERS. 8vo. 7s. 6d. (Presented.) Swan, Sonnenschein & Co., Ltd.) London, 1910.

A Dictionary of the Pathan Tribes on the North-West Frontier of India. Prepared by the General Staff, Army Headquarters, India. Crown 8vo. (Presented.) (Government Printers, India.) Calcutta, 1910.

Fair Play for Territorials: A Scheme for Proportional Army Pay for the Territorial Forces. By Lieut.-Colonel J. J. DE ZOUCHÉ MARSHALL, V.D., R.A.M.C. (T.F.). 8vo. 1s. 6d. (Presented.) (Bull & Son.) London, 1910.

Costumes of the British Army, 1828-30. 64 Plates. By E. HULL. Engraved by Engelmann, Graf, Coindet & Co. 4to. £64. London, 1828-29.

Costumes of the British Navy and Royal Marines, 1828-30. 26 Plates. By M. GAUCI and E. HULL. Engraved by Engelmann, Graf, Coindet & Co. 4to. £26. London, 1828-30.

Sea Wolves of the Mediterranean: The Grand Period of the Western Corsairs. By Commander E. HAMILTON CURREY. 8vo. 10s. 6d. (John Murray.) London, 1910.

Compulsory Service: A Study of the Question in the Light of Experience. By General Sir IAN HAMILTON. Crown 8vo. 2s. 6d. (John Murray.) London, 1910.

Lectures on the French Revolution. By Lord ACTON. Edited by J. N. FIGGS and R. V. LAURENCE. 8vo. 10s. (Macmillan & Co. Ltd.) London, 1910.

Notes on the Training, Equipment and Organisation of Cavalry for War. By Lieut.-Colonel F. M. EDWARDS, D.S.O., I.A. 8vo. 6s. (William Clowes & Sons, Ltd.) London, 1910.

RECENT PUBLICATIONS OF MILITARY INTEREST.

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PREFATORY NOTE.

This Pamphlet will be issued quarterly, in April, July, October and January. Its purpose is to draw the attention of Officers to British and Foreign publications of Military interest which are likely to assist them in their professional work. Copies of the pamphlet will be distributed to the Headquarters of Commands Educational Establishments, Units and Reference Libraries.

PART II.¹

SECTION I.

POLITICAL.

The Native States of India. By Sir William Lee-Warner, K.C.S.I. 406 pp. and index. 8vo. London, 1910. Macmillan. 10/-.

This valuable addition to the literature on British India is a work of more than passing interest. The relations of the Native States of India to the Supreme Government present a problem of unusual complexity, and it can be easily understood that the feeling between the Government of India and the hereditary rulers and nobles of the Native States has a vast influence on our policy in India. Hence, a study of the question cannot fail to be of interest, and this particular book with all the wealth of detail and information imparted by Sir William Lee-Warner, is one that will be read by all students of the subject.

Indian Pictures and Problems. By Ian Malcolm. 294 pp. with 50 illustrations. 8vo. New York, 1907. Dutton. 12/-.

An interesting and well-written book in which incidents and problems of life in India, on the North West Frontier, and Burmah are quoted and discussed in simple and straightforward language. The writer gives frank credit to the labours of British officials in India, and to the success with which these labours have been attended.

¹ The titles of all books are given in English; this does not indicate that the books have been translated. The original title in the language in which a work is written, if not in English, is given in brackets.

The Position of France with Regard to German Expansion (L'expansion de l'Allemagne et la France). By Henry Andrillon. 298 pp. 8vo. Angoulême, 1909. Imprimerie Militaire L. Coquemard.

This is an interesting study. The author regards the expansion of the German Empire as the greatest danger to Europe at the present time, and draws a graphic picture of the superiority of Germany to her neighbours. He shows that Germans look upon France and Great Britain as decaying races and degenerate nations, who have passed the zenith of their power and are now on the downward path. He does not, however, himself believe this to be the case, but says that Frenchmen at any rate only require to be aroused from their lethargy and to be made to realise their danger before it is too late. He gives a detailed description of German education and intellectual thought, and shows how much of Germany's success is due to her schoolmasters and professors. The Germans instil patriotism, sense of duty and loyalty into their children, whilst this important duty is neglected, nay even forbidden, in France and Great Britain.

Persia in Revolution, with Notes of Travel in the Caucasus. By J. M. Horne and Page L. Dickinson. 218 pp. with numerous photographs. 8vo. London, 1910. Fisher, Unwin. 5/-.

An interesting and lightly written book on the present situation in Persia. The four final chapters deal with Baku, Tiflis, and the Georgians.

Revolutions in Persia: the Provinces, the People and the Government of the King of Kings (Révolutions de la Perse: les provinces, les peuples et le gouvernement du Roi des Rois). By Victor Berard. 368 pp. and one map. 8vo. Paris, 1910. Armand Colew. 3/-.

The title explains the contents of this interesting volume. After a résumé of the general history of the country and its customs, the author turns to a more detailed review of Persia from the year 1796, when Aga-Mahomed, the first of the Kajar dynasty, ascended the throne. After dealing at length with the various provinces, the author details the history of the government of Persia under the Kajar dynasty, and closes with an interesting chapter on the revolution.

The Tasks of the Russian Army (Задачи Русской Армии). By General Kuropatkin. 3 vols. 1,526 pp. 4vo., with 32 maps and plans. St. Petersburg, 1910. Berezovski. 10/8.

This monumental work contains at once a history of the Russian army in the past, and a consideration of the various measures which the author considers necessary for the increase of the military power of the Empire in the future. It has been written, as the preface explains, with the patriotic object of assisting the revival of nationalist feeling.

Volume I, which deals with the period from the fifteenth to the eighteenth centuries, contains an account of the civil wars which welded together the Russian tribes, and of the external wars which resulted in the expansion of the Imperial territory to the Baltic, Black and Caspian Seas, and to the Asiatic and Pacific Oceans.

Volume II contains an account of the subjugation of the Caucasus, the conquest of Central Asia, Russia's share in the Napoleonic wars, and a history of the campaigns against Turkey, including the Crimean war and the Russo-Turkish war of 1877-78. The account of the development of Russia's dominion in Central Asia in Chapter XIX, pages 95 to 417, is of especial interest to English readers. According to the author, the conquest of Turkistan and Trans-Caspia, which was carried out in opposition to the wishes of the central Government, has increased the material well-being of the native inhabitants, and has added to the Empire a vast territory, which has already ceased to be a charge on the Imperial Treasury. Russia's strategical position in Central Asia is considered to be of primary importance, for while adhering to the opinion expressed in his last book that the Empire has nothing to gain by a further advance to the south, the author thinks that the mere concentration of an army on the northern frontier of Afghanistan—a simple matter with the present railway system—would cause such excitement among the native population of India as fully to occupy Great Britain's small army and prevent all possibility of enterprises of the nature of a second landing in the Crimea. Great Britain's policy is now as always directed with a view to the maintenance of the balance of power in Europe. She is seeking for allies in the coming conflict with Germany, but she must understand that Russia has nothing to gain by an alliance with her in Europe. Great Britain can only be of use to Russia by helping to fight the battle of Europe against the yellow race in the Far East. The Russian menace in the Middle East will prevent Great Britain from opposing the Empire in Europe or Asia. It will even force her to co-operate in Asia.

In Volume III, "The Task of the Russian Army in the Twentieth Century," the two chapters of greatest interest to the military reader are Chapter XXXII, "The Military Position of Russia at the end of the Nineteenth Century," and Chapter XXXVIII, "Measures for Strengthening Russia's Military Position."

The want of success of the Russian arms at Dresden and Leipzig, Inkerman and Chernaya Ryeka, and in the assaults on Plevna, is attributed to identical reasons, viz., shortcomings in the higher command, want of co-operation between columns, want of continuity of effort in each of the columns, and failure of the cavalry and artillery to support the infantry.

In the nineteenth century, without counting the subjugation of the Caucasus and the quelling of the Polish rebellion, Russia engaged in 15 external and three internal wars, and suffered losses in men amounting to 1½ million.

During this period the army fluctuated much in strength. Catharine the Great left an army of 533,000 (peace and war strength) at her death in 1796. Reduced at one time to 400,000, its strength had risen to 630,000 in 1825, and by the end of the Crimean War to a peace establishment of 850,000, expanding on mobilisation to 1,130,000. During the 14 years of peace which followed, the peace strength fell to 367,000 (1869), but the Government became alarmed at the rapid rise of Germany, and universal service was introduced in 1874.

The army is still recruited under this law of 1874, which is now quite out of date. Only 81 per cent. of the population is liable to service, and a percentage amounting to about one-half of these is excused on account of family reasons, whereas in Germany and Austria family exemptions amount to only 3 to 5 per cent., and in France they are non-existent. The consequence is that, in spite of Russia's enormous population, it was found impossible to fill the peace cadres without passing in men of inadequate physique. Thus, while in Austria as many as 50 per cent. of the recruits have been rejected as unfit, and in Prussia 37 per cent., in Russia at the end of the nineteenth century only 17 per cent. were sent back. The author is therefore of opinion that the rank and file of the army has deteriorated as the peace establishment has increased. On the other hand, the officers as a whole have improved.

An interesting analysis represents the number of officers of various ranks in 1907 of non-Russian names as generals, 41 per cent.; lieutenant-generals, 36 per cent.; major-generals, 37 per cent.; captains, 31 per cent.

A large part of Chapter XXXVIII. is merely a reprint from the General's last work, "The Russian Army and the Japanese War." (See Vol. II., p. 99 *et sequitur*. Captain Lindsay's translation.)

In his attitude of mind towards non-Russian fellow subjects and notably towards the Jews, whom he would altogether exclude from the army, the author subscribes to the political creed of the Russian Nationalist Party.

He would like to see an agreement arrived at with Austria-Hungary by which spheres of influence in the Balkan Peninsula might be demarcated and a policy of peaceful co-operation initiated in the Near East. He would then concentrate diplomatic and military effort to resist the "Yellow Peril" in the Far East. The danger to Russia of a modernised China in alliance with Japan is ever present to his mind. It would be interesting to learn what he thinks of the recently concluded Russo-Japanese Convention, which seems to have already falsified his prognostications.

Briefly stated, General Kuropatkin thinks that the task of the Russian Army in the twentieth century should be to defend the territory already conquered, and that the Government should, by avoiding a policy of adventure, endeavour to gain time for the development of material resources and the consolidation of national feeling.

The book is unnecessarily long, and is full of repetitions, but it is written in simple Russian, and is easily read.

STRATEGICAL AND TACTICAL.

Cavalry in Peace and War. By General Freiherr von Bernhardt. Translated from the German by Major Bridges, D.S.O., 4th Dragoon Guards. 368 pp. 8vo. London, 1910. Hugh Rees. 7/6.

The original German edition of this book was fully reviewed in the number of R.P.M.I. published last April, pages 100-102. It contains a critical survey of the rôle, tactics, training and organisation of cavalry, written with special reference to the German cavalry, but General Bernhardt's teachings afford valuable instruction to all.

General Sir J. D. P. French has written a preface to Major Bridges' translation. In this he emphasises the importance of officers studying the training, tactics and organisation of the best foreign cavalry, and points out the mistake that will be made if we imagine that our recent experience of war has been so considerable that we can have nothing to learn from Europe.

This is the second translated work of General Bernhardt's for which General French has written a preface; in both he expresses his strong appreciation of Bernhardt's writings. In the book under review he draws special attention to the author's remarks on reconnaissance, cavalry fight, combination of fire and shock tactics, the divisional cavalry, strategic cavalry, training and organisation.

General French is fully in accord with Bernhardt's teachings except in the matter of raids. The latter holds that the disturbance of the communications of an army is an important matter, and will often do the opponent more damage and contribute more to a favourable decision of arms than the intervention of a few cavalry divisions in the decisive battle itself. General French, on the other hand, agrees with the German regulations which state "Enterprises of long duration by large bodies of cavalry against the enemy's lines of communication separate them from their principal duties. Such raids are to be undertaken only when cavalry is redundant. Sufficient ammunition and supplies must be carefully arranged for."

In this preface General French writes:—"But I am convinced that some of the reactionary views recently aired in England concerning cavalry will, if accepted and adopted, lead first to the deterioration and then to the collapse of cavalry when next it is called upon to fulfil its mission in war. I therefore recommend not only cavalry officers, but officers of all arms and services to read

and ponder this book, which provides a strengthening tonic for weak minds which may have allowed themselves to be impressed by the dangerous heresies to which I have alluded."

The Russo-Japanese War. Lectures given at the Russian Staff College. Translated from the Russian, Parts VII., VIII., IX. (Conférences sur la guerre Russo-Japonaise faites à l'Académie d'état-major Nicolas. Traduit du Russe, Fascicules 7, 8 et 9.)

Part VII.—"A Strategic Sketch of the Offensive Action by the 2nd Manchurian Army in January, 1905." General Mischenko's Mounted Detachment during the offensive action of the 2nd Army in January, 1905." 209 pp., including 4 appendices, 12 sketch maps. 8vo. Paris, 1909. Henri Charles. 4/2.

Part VIII.—"The Battle of Mukden." 446 pp., including 16 annexures. Table of contents plans and annexures. 16 plans at the end of the book. 2 appendices (orders of battle of Russian and Japanese armies). 8vo. Paris, 1909. Henri Charles. 8/4.

Part IX.—588 pp., with 4 maps and Table of Contents. 8vo. Paris, 1910. Lavauzelle. 8/4.

The first 60 pages of Part VII. consist of a lecture delivered at the Russian Staff College by Colonel Novitski, who deals with the operations of the Second Army. In the next 96 pages is embodied a lecture delivered there by Colonel Vadolski, who treats of the operations by General Mischenko's mounted detachment. Reference is also made to General Kossagowski's detachment. Both detachments operated on the right flank, and in support of the 1st Siberian Corps, which formed the right of the Russian attacking line.

The four appendices are reprints of articles which appeared in the *Russki Invalid*, and contain respectively:—

- a. A detailed (anonymous) account of the orders issued to and engagements fought by the 1st Siberian Corps;
- b. A memorandum by General Gripenberg on the battle of Sandepu (Heikoutai);
- c. Observations by the same General on this battle;
- d. Extracts from an account by the officer commanding 7th European Rifles of the part which this regiment played during the battle.

The maps include:—A general map to illustrate the operations of the Second Russian Army; five maps illustrating the phases during the fighting, 24th to the 28th January; a general map and five maps showing each day's positions to illustrate Mischenko's operations.

Kuropatkin is severely criticised throughout the work; the full extracts from his orders prove how greatly these trespassed upon his subordinates' prerogatives; they show, too, an astonishing formalism and absence of offensive design. Gripenberg was also guilty of many errors; the time before the battle was spent by him in entrenching to the detriment of reconnoitring activity; large detachments were echeloned to the rear in order to protect a flank the safety of which would better have been ensured by offensive action; 70 per cent. of his effectives were not engaged during the first days; and the characteristic mixing up of units was as evident in his dispositions as elsewhere on the Russian side. The detachments could generally not intervene when their aid was required, and troops arrived on the scene fatigued and dispirited. Clearly marked, too, was the tendency to withdraw troops without cause when they had scored a partial success. Inter-communication and orders were faulty, Generals did not know how to utilise their staffs, and some of the latter were incompetent.

To quote Colonel Novitski:—

"The contempt for the study of war which existed amongst us before the war, and consequent paucity of men endowed with higher military knowledge, produced most unfortunate results, especially as many who possessed this knowledge lived apart from the troops (in continuous staff employment)."

General Stackelberg's vigorous tactics form a pleasing contrast to the general conduct of affairs.

General Mischenko's operations met with some success, although his cavalry appear to have been somewhat "sticky." The translator points out how the absence of a bayonet handicapped the Cossack trooper who (unlike the Russian Dragoons) had only a sword and carbine, the latter being slung and sword drawn on approaching the enemy. Pages 107 and 108 contain an account of a cavalry charge which was arrested by an unreconnoitred ravine: pages 111-112 describe a mêlée between Caucasian horse and Japanese infantry. This part of the book—which is instructive reading for a cavalry man—concludes with a discussion on dismounted action (which is said to have been dictated on most occasions by existing conditions), inter-communication, the wrong use of cavalry by the Russians (unduly tied to infantry), the best organisation, training, tactics, and leaders for cavalry.

The body of Part VIII. is taken up with lectures on the fighting at Mukden and the Russian retreat to Tieh-ling. The lecturer (Colonel Dobrovolski, of the Russian General Staff) begins with a description of the Russian forces and plans on the eve of the great battle. He clearly shows how unsuitable for attack was Kuropatkin's distribution of his armies. Ten army corps lay side by side on a front of 85 versts (nearly 60 miles); in front of them was a line of works and

obstacles broken only by one gap of any size; a general reserve of two army corps was divided into three widely separated portions. The line of these reserves was some seven miles in rear of the fighting position. Each of the numerous (sometimes conflicting) reports of hostile advances led to a movement hither and thither of these reserves, and, worse still, to a breaking up of tactical units which finally precluded all efficient direction and staff work. Example:—A detachment on the Liao-ho was broken up on the 25th February (first phase) and placed in rear of the centre; in its original position it would have been of great use in watching Nogi's progress. It was replaced by a small force drawn from many different units. Pages 79-88 of this volume deal with the same subject. The hesitating attitude of higher commanders is very noticeable: General Kaulbars, who had lately written a memorandum urging concentration of crushing numbers to drive an attack home, when himself opposed to Nogi simply lengthened his line so as to keep level with the advance of the Japanese commander, who was executing a flank march. Kaulbars and other Russian Generals indulged in constant reconnaissances and attempted to reinforce by dribbets all points that were temporarily pressed, thus wearing out their men and frittering away their reserves. Concerning the fortifications, which are clearly explained in Annexure No. 1 and Plan No. 1, the lecturer criticises their unsystematic character: cramped in front line, without supporting works, no connection between the foremost entrenchments and the girdle of detached works around Mukden.

When describing the retreat, he draws attention to the serious consequences which ensued from the retention of baggage trains with units, in defiance of the Commander-in-Chief's orders.

In the opening pages are given the distribution of the armies (and on the Russian side of army corps) of the opposing forces.

On pages 159, 160, the Russian losses are given, and are compared with those at Leipzig, Aspern and Borodino. The percentage of casualties is also given, and compared with those sustained in great battles of the 19th century in which the Russians fought.

In Annexure 2, the Russian G.O.C. i.e. communication affairs and intelligence, in replying to some of the lecturer's allegations, gives some interesting details regarding the Russian intelligence, which seems to have been fairly efficient. Apparently Nogi's whereabouts were reported as early as the first week in February to Russian General Headquarters. Pages 179-183 exemplify the difficulties due to the absence of alternative lines of communication behind the Russian armies. The various annexures contain many graphic descriptions of fighting by smaller units. One is struck by the small effect of heavy artillery to which these narratives testify. Although parts of this volume are written in a somewhat emotional discursive way, it forms a valuable repository of war experience.

Part IX. is divided into three portions. The first portion, compiled from lectures delivered at the Russian Staff College, deals with the operations between the 5th May and 31st July, 1904, i.e., between the date of landing of the Japanese besieging army and the beginning of the close investment of Port Arthur; the second portion gives a summary of the siege operations, and is merely a *résumé* of Colonel Schwarz's work; the third portion contains a report of the Stessel trial.

The first portion is of special interest. We are told that the Russians were well informed concerning the movements of the Japanese transports prior to the disembarkation in Manchuria, and reasons are given for the supine attitude of the defenders. The alternative plans of defending a position in front or in rear of Nan Shan are discussed, and the neglect to place long-range coast defence pieces on the Nan Shan position itself is deplored. We learn that the Russians directly after Nan Shan retreated as far as the Wolf Hills, subsequently advancing once more to the hills overlooking Dalny, as a result of the representations of the late General Kondratenko.

The easy Japanese victory on the 30th July is known to have been largely due to the high crops which concealed their advancing troops. The book tells us that in the early spring General Stessel had ordered the Civil Commissioners of the Kuan-tung Peninsula to prevent the Chinese from sowing crops with tall stalks, but his orders were disregarded. Immediately preceding the account of the close investment are data regarding organisation, armament, supplies, chain of command and distribution of staff duties.

A "conclusion" to the first portion contains the following comments:—"The completion of the permanent defences of Port Arthur was fixed for 1915, time and means alike forbade the garrison from accomplishing more than they did; the Port Arthur garrison should have attempted to co-operate with General Stokelberg in May and June, 1904, by means of sorties; reports from Russian subordinate commanders to headquarters were frequently "coloured" by the desire for early reinforcement, and were, therefore, misleading; a knowledge of his subordinates' character is the only guide which the chief commander possesses for dealing with such cases; since higher commanders are nowadays entirely dependent upon reports during an action, all officers should receive constant practice in composing short and clear reports and orders; trenches must be deep, with very steep sides and no parapets; the Japanese infantry employed no "sealed" pattern" attack formations.

As in other Russian works, exaggerated accounts of Japanese losses are given; the figures for Nan Shan are 7,000 instead of 4,054; in the July fights the Third Japanese Army is said to have lost from 8,000 to 12,000, the actual numbers being under 4,000; the Japanese losses during July and August are reckoned at some 30,000 dead on the authority of Chinese information.

[See also R.P.M.I. Nos. 2, 4 and 5.]

Machine Guns and their Tactical Uses. By Lieutenant V. A. Jackson, York. and Lanc. Regt. 68 pp. 8vo. London. 1910. Foster, Groom & Co. 1/6.

Major-General Sir H. Rawlinson has written the preface to this little book, in which he discusses briefly the employment of machine guns dispersed and in batteries, favouring the former use. He points out that our machine gun equipment is susceptible of improvement. The author gives as his objects in compiling the book:—(1) To enumerate some of the difficulties which stand in the way of a machine gun officer. (2) To combine in a single pamphlet all the information found in the official text books bearing on machine guns. (3) To describe some of the methods of training men in machine gun work which the writer has tried and found to give good results.

The book should prove a help to officers in charge of infantry machine gun sections. The author has not dealt with the subject from the point of view of mounted troops.

Machine Guns in Co-operation with Cavalry. Vol. 2 (Mitrailleuses de Cavalerie). By J. C. Lavau, Captain Commandant of the 15th Dragoons. 916 pp., with about 100 engravings in the text. 8vo. Angers, 1910. Sirandeanu. 7/-.

Like the first, the second volume of this work reviews the ideas on the employment of machine guns which prevail in various countries, and the lessons which the military writers of the several armies have drawn from the examples of recent wars. Few original ideas are actually put forward by the author, but much skill is displayed in the arrangement and selection of the subject matter. The war most often quoted is the recent campaign in Manchuria, and some of the conclusions arrived at are interesting.

The principles of the infantry attack against machine guns are practically the same in all countries. The attack should be made in short extended lines at varying intervals. The time occupied by the guns in finding the range should be taken advantage of by the infantry to approach, if possible, to within 500 yards of them—a range at which no machine gun can stand its ground when subjected to infantry fire. It should be remembered in an attack on machine guns that a few good shots are as likely to achieve decisive results as great numbers of men, whilst the loss will necessarily be smaller. Another important point which should not be lost sight of is that machine guns move rapidly, and are by no means to be considered crushed when they evacuate a position. The most effective way of paralysing their action is either to anticipate them in positions they are likely to occupy, or to seize points of vantage from which they may be overwhelmed by fire before they can come into action. When machine guns are placed in an infantry line, or cannot be approached under cover, every interruption in their fire should be taken advantage of to advance by rushes. Artillery at long ranges can render invaluable assistance to infantry attacking machine guns in position. The Japanese infantry often demanded that their artillery should rid them of Russian machine guns which were causing them losses in the face of which they were unwilling to advance; and innumerable examples drawn from this war go to prove what formidable weapons properly handled machine guns can be.

There are numerous points, however, on which military critics are far from unanimous; whether, for instance, machine guns should be grouped in batteries or be distributed among the various units. In America the prevailing opinion is that machine guns should be grouped in batteries under the direct control of the commander, who should use them exclusively in the decisive phases of the engagement, thus avoiding wastage of ammunition, though the Boer War seems to show that consumption of ammunition by machine guns was seldom excessive. Both Japan and Russia have augmented the numbers of their machine guns since the war, and in Germany many writers are demanding a similar augmentation. One of the main reasons on which the demand is based is that, owing to the increased range of rifles, artillery can but with difficulty accompany and support the decisive infantry attack. Many writers also urge the necessity of shields for machine guns.

The greatest stress is laid by the author on machine guns with cavalry. He contends that they are not an encumbrance, do not retard the most rapid movements, and give cavalry great power of resistance. The Swiss cavalry are described as being very proficient in the handling of its machine guns. General Langlois is quoted as laying stress on the fact that the Swiss machine gun is adjusted as a side, and not a top load on the horse; this, he says, by lowering the centre of gravity of the load, gives great freedom and rapidity of movement to the gun detachment.

The information in the book is certainly useful, and a perusal of the volume would save students of the subject a considerable amount of labour.

Tactics. Vol. II.—Cavalry: Field and Foot Artillery in Field Warfare (Taktik Zweiter Band. Kavallerie: Field-und Fussartillerie im Feldkriege). By Colonel Balck. 431 pp., with numerous diagrams and an index. 8vo. Berlin, 1910. Eisenschmidt. 8/6.

This is the fourth edition of the second volume. The book is arranged in two portions: the first devoted to cavalry, the second to field artillery. The principles set forth are those of the German training regulations, which are freely quoted and referred to throughout the book. The subjects discussed are illustrated by examples from recent military history, and by numerous extracts from foreign manuals showing the views and methods prevailing in other countries.

First Portion: Cavalry.—This portion is divided into six parts. Parts I. and II. deal with establishments and formations. Part III. discusses the employment of cavalry in action. In relation to dismounted action Colonel Balck remarks: "Cavalry can be very useful on foot, but the decision of a fight is always brought about by mounted attack. Cavalry employed dismounted may act as a screen, but it cannot reconnoitre." The numbers of men per squadron of 140 available to fight dismounted is stated to be as follows:—

Great Britain and Germany	...	...	70 to 105
Austria, France, Italy	...	...	70 „ 135
Russia:			
Dragoons	...	...	94 „ 117
Cossacks	...	...	up „ 135

One section of Part III. is devoted to British views on the subject of mounted infantry. The author looks on this arm unfavourably, and considers its employment only justifiable when climatic conditions make long marches impossible for infantry.

Parts IV., V., VI. deal with the mounted attack against cavalry, infantry and artillery respectively, and are illustrated by diagrams showing the formations adopted for the attack in different countries.

The following tables appear useful for reference:—

Page 8.—Comparative table of war establishments of squadrons and regiments; transport, armament, ammunition, technical equipment and weight carried by the horse in the cavalry of the chief European States.

Page 14.—Comparative table of establishments and organisation of cavalry divisions of various nations.

Page 431.—Details of firearms carried by the cavalry of various countries.

Second Portion: Artillery.—This portion, entitled "Artillery in Field Operations," is divided into nine parts. Part I. compares the armament, organisation and mobility of field artillery in various countries. Part II. deals with drill and manoeuvre. Part III. (Employment of artillery in action) discusses, among other points, position of artillery in columns on the march; covered positions; fire tactics; and expenditure of ammunition. Under the heading "Fire Tactics" the regulations of the chief military States are freely quoted, with diagrams illustrating the effect of different methods of fire.

As regards artillery escorts, Colonel Balck points out that they are not now considered indispensable, except in special cases, e.g., when guns are on an exposed flank. He suggests that cyclists may prove the best escort when guns have to move forward rapidly.

In Part IV. ((The Attack), under the heading "Co-operation of Infantry and Artillery," the British "Field Artillery Training, 1907," is quoted at some length.

A new feature of modern battles will, Colonel Balck considers, be the attack on artillery observing stations. These stations are easier to locate than concealed batteries, and the latter are, as it were, blindfolded if deprived of their observing stations. He suggests, as a means of ensuring co-operation between the guns and the attacking infantry, that particular units of artillery should be detailed to support particular units of infantry. Thus No. 1 *Abteilung* (three batteries) of field artillery would be detailed to support the 1st Infantry Regiment; or the same section of the enemy's front could be allotted to a regiment of artillery and to a brigade of infantry.

Under the heading "Attack on an Enemy already Deployed" the author points out that in France the artillery is told off to separate tasks from the outset of the engagement; whereas in Germany the artillery commander details certain artillery units to fire at the enemy's infantry as the fight proceeds. The first artillery position should, he considers, be 3,000 to 4,000 metres (3,300 to 4,400 yards) from the enemy's position.

Part V. deals with the defence; it is laid down as a principle that the line which the artillery will occupy during the decisive phase forms the structural framework of a defensive position. Colonel Balck is in favour, when circumstances permit, of reserving the fire of the guns till the enemy is within effective range.

Part VI. deals with "Retreat."

Part VII. is a résumé of the tactical portions of foreign artillery training manuals.

Part VIII., which is very short, contains a few data regarding mountain artillery.

Part IX. discusses the action of horse artillery with cavalry; the author favours keeping the batteries of the horse artillery *Abteilung* together on the inner flank of the cavalry, as opposed to the practice of placing one battery on each flank.

The following tables and diagrams will be found useful for reference:—

Page 189.—Comparative table of gun and howitzer equipments of the chief military States.

Page 190.—Ballistic data of the French and German field guns.

Page 211.—Peace and war establishments of the batteries of the chief military States.

Page 223.—Paces of artillery in different countries.

Pages 249-251.—Diagrams of batteries of various countries in action.

Page 258.—Diagram of a German heavy howitzer battalion in action.

Page 269.—Diagrams of cover for guns and howitzers in Germany, Austria, and Russia.

The book concludes with an index for each portion.

(To be continued.)

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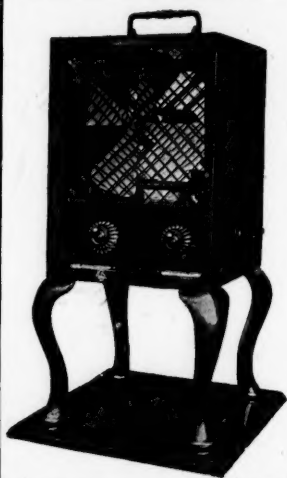
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